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Contributions.

Theory of Velocity Grades.

Troy, N. Y., Jan. 16.

To the Editor of the Railroad Gazette:

Mr. Wentworth's explanation of the velocity grade fomulas is not altogether satisfactory to me; nor does Professor Allen's statement of the question very much better it. I realize that space in the Railroad Gazette is too valuable to be occupied with long arguments, but this subject of momentum grades, at which a few years ago almost every one laughed, is now coming to be a very important subject, and the possible length of a momentum or velocity grade is one of the most important considerations in the general subject. But before going into the question of momentum grades, let us look at Mr. Wentworth's tractive force formula. It is $T=\frac{4D}{S+10}$ in which T is the tractive force of the locomotive in pounds, D the weight on the drivers, also in pounds, and S is the speed in miles per hour. Assuming that this is a correct form for a tractive force formula, and needs only to be changed in its constants to be correct, and with the understanding that it is not intended to fit any particular locomotive, let us see how it fits each of several locomotives whose tractive force at various speeds has been determined by Mr. E. M. Herr, and presented in a paper before the Western Railway Club. We will assume the coefficients of D to be good, and will determine what values of the denominator constant are required to make the observed results agree with the formula.

Speed in Miles per Hour.

Engine.		5	10	15	20	25	30	35	40
Class.	Description.	Values of denominator in $T=\frac{4D}{S+X}$ for various speed.							
D_2	Simple mogul	S + 11.8	S + 9.3	S + 9 2	S + 11.0	S + 13.6	.....	.....	.....
F_1	Simple consolidation	S + 10.5	S + 8.4	S + 10.8	S + 15.1	S + 22 8	....	....	...
R	10-wheel compound	S + 12.2	S + 9.4	S + 7.4	S + 6.5	S + 7.2	S + 8.5	S + 9.9	S + 11.2
P	10-wheel simple		S + 6.6	S + 3.9	S + 2.2	S + 2.1	S + 2.8	S + 3.2	S + 3.4
X	Compound Mastodon	S + 8.3	S + 6.7	S + 5 8	S + 6.7	S + 8.8	S + 12.0	.....	....

This table shows, as was to be expected, no particular value for the denominator constant that will fairly average the various locomotives or that will represent what might be called an ideal engine. The fact is that the tractive force of the engine above, say, 10 miles per hour is not at all governed by the weight on the drivers, but by the horse power capacity of the boiler and cylinders, and it may be readily shown that the cylinder tractive force for a constant horse power capacity is given by the simple expression $T=\frac{375\,I\,H\,P}{S}$ where S is the speed in miles per hour, and T is the tractive force in pounds. Now an ideally designed freight engine would seem to be one that could exert this full power down to some minimum speed of, say, 10 miles per hour, at which point its tractive force will be limited by the weight on the drivers. That is, the horse power and weight on drivers should be so proportioned that there shall be ample power to utilize the full adhesive traction at low speed, and that constant horse power shall be maintained at all velocities above the prescribed minimum, to the extreme required by the service for which the engine is designed. It is a noticeable fact that freight engines of approximately the same horse power differ widely in weight on drivers. This should not be except they be designed for quite different service. The formula $T=\frac{375\,I\,H\,P}{S}$ ought to hold good down to a determined minimum speed, and it would seem that 10 miles per hour is not too fast for this low limit. The realization of this formula down to this speed is nearly reached by some engines. The formula fits most engines through a considerable range of high velocities, and is in disagreement only at the lower speeds below 15 or 20 miles per hour. Of course not all this indicated horse power gets to the rails, and very much less than this gets behind the tender.

Now as to the velocity grade formulas. The first one would, I think, be improved by using the mean tractive force of the locomotive for the limiting speeds S_1 and S_2, and making the usual 6 per cent. allowance for wheel energy. This formula would then stand

$$T=\frac{P_m\,L}{L(R+20G)-7/10\,(S_1^2-S_2^2)}$$

This formula simply says that the work done by the engine (= the average pull times the distance, 100L, pulled) must be equal to the work to be done on the train (= the average rolling resistance in pounds per ton + the grade resistance in pounds per ton, all multiplied by the weight of the train in tons and by the distance, 100L) less the work done on the train by the surrender of velocity (= the weight of the train times the difference in velocity head for the initial and final speeds). The well known grade resistance formula is $r=20G$, where r is the resistance in pounds per ton and G is the grade in rate per cent. The formula for velocity head, which is the distance through which a body must fall to gain the given velocity, with a 6 per cent, addition for energy of rotating wheels, is $h=0.0355S^2$, where S is the speed in miles per hour. The algebraic operations necessary to put the first velocity grade formula into simple shape are responsible for the particular values of the constants. Now for the purpose of analysis it will be well to transpose this formula and assuming a given load, solve for the length of grade of rate G, that can be handled by a given engine starting at a speed of S_1 and being slowed down to a speed of S_2. I believe the problem more often arises in this way than otherwise. The transposed formula is

$$L=\frac{7/10\,(S_1^2-S_2^2)}{R+20\,G-\frac{P_m}{T}}$$

This formula gives essentially the same results as the method suggested by Mr. McHenry, Chief Engineer of the Northern Pacific Railway, who gives this rule, $L=\frac{d}{g-g_1}$ in which d is the difference in velocity head for the initial and final velocities, g is the grade in question, and g_1 the virtual grade for the engine for the given load and mean tractive force for the given speed limits. The two formulas are exactly interchangeable, for $\frac{P_m}{T}=R+20g_1$.

These formulas indicate that the length of the momentum grade may be obtained geometrically by laying off on a piece of profile paper at the foot of the given grade a vertical line equal to the difference in velocity head and drawing from its upper end a grade line equal to the virtual grade for the given load and mean tractive force and resistance, and noting where the virtual and actual grades intersect. The point of intersection fixes the limit of the momentum grade. This is the method of Prof. Allen in his paper in the Railroad Gazette of the 12th inst., except that Prof. Allen uses the virtual grade for the minimum speed rather than for the mean tractive force. This method gives lengths of grade probably much too great. Just what the virtual grade corresponding to the varying tractive force and resistance is can not be easily told. It is doubtless a curve beginning with the grade corresponding to the initial velocity, and ending with that corresponding to the final velocity, and from some drawings I have made I believe it will almost always meet the given grade at a point in advance of that given by the mean tractive force formula. I should not be surprised if the omission of the coefficient of the revised Wentworth formula would give very near the truth for many grades. This formula would then be $L=\frac{S_1^2-S_2^2}{R+20\,G-\frac{P_m}{T}}$. It would be interesting to know how closely experiments on the Northern Pacific or elsewhere agree with the McHenry fomula. There are so many accidentals in train motion that can not be considered in theoretical formulas, that it is not at all unlikely that the formula for average conditions may most nearly represent what can be actually done.

But now as to Mr. Wentworth's seventh formula. It seems to me that he has not found the length of momentum grade of given rate that can be worked by a given engine, because he uses a weight that the engine can handle on the grade itself at the inferior speed limit, and hence the grade is not what is called a momentum grade at all. The formula still gives the point at which the stored energy is expended, but the train goes on indefinitely, and there is no limit to such a grade. This will be readily seen if, instead of assuming the load for the minimum speed, the load for the mean tractive force be assumed. The result of substitution in the formula will be L = infinity. With the heavier load due to the slower speed, L becomes finite, but is of no service in showing how long the grade may be. If the load assumed be that for the ruling grade of the road at the low speed, the result is perfectly rational and serviceable. But no grade of less rate than the ruling grade can be said to be a momentum grade. Such a grade is operated by stored energy only for the purpose of maintaining higher average speed, and in velocity problems we may discuss the point on any grade at which the train will get down to a uniform velocity, but this has nothing to do with the length of such grade that can be, as a matter of possibility, operated as a momentum grade, unless the grade be steeper than that for which the engine is loaded for the minimum speed.

WM. G. RAYMOND.

To the Editor of the Railroad Gazette:

"With regard to the reasonableness of the formula $P=\frac{4D}{S+10}$," Mr. Wentworth, in your issue of Jan. 5, 1900, page 1, refers "to page 532 of Wellington's Railway Location, where it is stated as a result of experiment that between speeds of 17 and 23 miles per hour the traction was found to be nearly ¼ of the weight on driving wheels." Mr. Wentworth here fails to draw a distinction between the total traction an engine is capable of exerting (its total adhesion) and the actual pull which the locomotive happened to exert in a trial where no attempt was made to determine the total force of adhesion between wheel and rail.

The symbol P which enters into several formulas on page 837, Dec. 8, 1899, is defined by Mr. Wentworth as "traction of the engine in pounds at the rails . . . the engine being supposed to be exerting all the traction it can at that speed." Wellington's words, page 532, are "actual average pull (nearly ¼ load on drivers)." An "average" pull is clearly less than the maximum exerted and evidently would not tax the adhesion.

As a matter of fact, the more complete records of the test (Journal of the Franklin Institute, April, May, 1879) show that no measure of the adhesion was taken or attempted, that the records of pull (traction) were indicator cards, that the engine was operated with an average cut-off of about ½, so that it could not have been expected that the limit of adhesion would be reached by the engine running in that way. The indicator cards giving the maximum result for pressure of steam showed pressures far in excess of the average for the run. The cards indicating these maximum pressures showed a tractive force of about $\frac{1}{4.25}$ of the load on the drivers, and there was no evidence given to show that even this taxed the adhesion.

Mr. Wentworth also refers "to Wellington, page 519, where the traction at starting, say six miles an hour, and at 50 miles an hour, are found to agree closely with the formula." Wellington's words are: "Mr. Dudley found the traction at starting to be 11,000 to 12,000 lbs. for the first 100 to 200 feet, falling to 2,800 to 3,000 lbs. at 50 miles per hour." The traction here referred to is not adhesion, but simply the actual pull of the locomotive, and Dudley's experiments simply illustrate the fact already well known that it takes more force to start a train than to keep it in motion.

The only evidence, then, that Mr. Wentworth offers in support of his formula for the maximum traction possible at any speed, turns out, when analyzed, to have no bearing on that point. The experiments to which he referred do, on the other hand, furnish evidence that at moderate speeds of 17 to 23 in one case, a pull was exerted, equal to about $\frac{1}{4.25}$ of the weight on drivers (and more than ¼ in several cases). The adhesion possible was doubtless definitely in excess of the traction exerted in either of these cases.

Allow me to state a correction two lines above my name, on page 855, Dec. 15, 1899. A coefficient of $\frac{7}{10}$ (not ¼) instead of ⅔ is what I intended to write.

KICKER.

Electro-Pneumatic Interlocking at the Boston Southern Station.*

By J. P. Coleman.

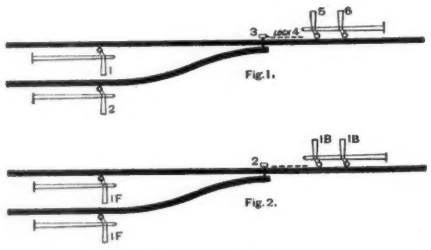
The Interlocking Machine.

The evolutions through which the design of a piece of mechanism passes from its first conception to the period of its greatest utility often render it difficult of interpretation to those not familiar with its development.

The interlocking apparatus used in the electro-pneumatic system has been no exception to this general rule. Those well versed in the art of interlocking, outside of this particular branch of it, have been more or less mystified by the radical departure from former methods of construction that was made in the first pneumatic machine built. Failing to fully realize the benefits resulting from the construction of that apparatus, it was but natural that each succeeding modification in it intensified rather than diminished the original feeling.

The growing necessity for power interlockings has at the present time created a desire on the part of many to fully understand the most modern methods and devices used therein.

The switch and signal operating mechanisms and the general equipment of such a plant have been dealt with in a description of the interlocking at the new Boston Southern Station. An attempt to render equally comprehensive a description of the interlocking machine there would be difficult and scarcely successful without some preliminary remarks and assumptions relating to an apparatus and to a system already well understood by many, hence this seeming departure from the text.



Figs. 1 and 2.

Fig. 1 represents a junction of two single track roads signaled and interlocked by a "mechanical" apparatus in accordance with present practice; distant signals being omitted for simplicity's sake. Each signal is operated by a separate lever, the switch by one lever and its lock and detector bars by another, making a total of six levers necessary.

The locking of this machine would be as follows:

1 locks 3 normal.	4 locks 3 normal and reversed.
1 locks 4 reversed.	
1 locks 5 normal.	5 locks 3 normal.
2 locks 3 reversed.	5 locks 4 reversed.
2 locks 4 reversed.	6 locks 3 reversed.
2 locks 6 normal.	6 locks 4 reversed.

It is possible to operate the above with but two levers, however, under favorable conditions and by means of mechanical appliances in common use, but not with the same degree of safety, nor with the same muscular effort on the part of the leverman or freedom from strains in the operating connections.

A switch and lock movement may be used to perform by means of one lever the work here assigned to levers No. 3 and No. 4. Signals 1 and 2 may be operated from one lever through a "selector" controlled by the switch lever. Signals 5 and 6 may likewise be operated through a selector from the lever operating signals 1 and 2, if the lever is made to stand normally in a central position and to move forward in operating signals 1 and 2 and backward in operating signals 5 and 6.

The load on the signal lever will be doubled by this arrangement, as will also that of the switch lever, but the number of levers is reduced one-third, (See Fig. 2) while the locking reads simply:

1 forward locks 2 normal or reversed.
1 backward locks 2 normal or reversed.

Were it not for the fact that extreme distances, and other conditions affecting mechanically operated switches and signals, would render this practice prohibitory, frequently; and, were it not true that well-founded objections exist to the use of selectors and switch and lock movements in mechanical interlockings, this assumed method might be employed to great advantage in large plants where tower space is valuable and where extreme complications in locking and lever movements are serious considerations.

If, therefore, some means be secured by which the load on levers so connected is easily handled by the operator; if the objectionable feature of switch and lock movements is overcome, and if the selector be discarded, or so modified as to avoid the present danger of false operation of signals through it, the means would find justification in the ends attained.

The objection to switch and lock movements in mechanical interlocking, as stated in a previous article, is directed against the small part of the lever's stroke that is available for locking the switch; and hence the risk incurred in forcing home (through lost motion in connections) the lever without accomplishing this important duty.

If the switch lever of such a machine were so controlled by the switch during operation that unless the latter became fully locked the catch rod of the lever could not be lowered (and hence its locking of other levers not released), the use of a switch and lock movement would not be objected to in the mechanical interlocking, where otherwise practicable.

Selectors are objected to almost solely on account of possible entanglement of the operating wires leading from them to the signals, resulting in danger of the pull wire of one signal clearing with the latter a signal conflicting with it—the "back wires" of all signals operated through a selector being necessarily joined in common to a single wire extending from them to the selector and hence being "slack" to all signals of the selector but the one engaged by it for legitimate operation.

This and minor considerations—such as difficulties in the matter of adjustment, fitting, and in the general arrangement of selectors in a manner consistent with the advantages intended to be secured by them—discourages their use, and it is pretty generally conceded that where used they are as expensive as, and are more troublesome than, the levers they would supplant.

The prime objection to them is, however, the danger incurred from the possibility cited, which may be said to result broadly from the fact that the motion of one wire may be accidentally transmitted to another during operation.

In the Railroad Gazette of November 10 and December 1, 1899, appeared a description of the switch and signal movement used in the electro-pneumatic system at the Boston Southern Station, with sectional drawings illustrating these devices.

Assuming that the construction and operation of these individual parts were made clear in that description, an effort will be made to render clear the advantages they possess in overcoming the objections cited as peculiar to the arrangement shown in Fig. 2, if they were so applied to that arrangement as to control from the two-lever machine the one switch and the four signals shown. The only connections that would be required between these two levers and the electro-pneumatic devices mentioned, were the latter substituted for the mechanical appliances ordinarily used in connection with these levers, would consist of electric wires suitably insulated and protected from injury.

The usual pipe and wire lines, cranks, compensators, wire and pipe carriers, rocker shafts, and the numerous foundations required for their support, together with much labor in installation and attention in maintenance would be entirely avoided in the lead-out of such a plant if it were thus equipped.

Problems as to the loads that are practicable of operation from one lever under the varying conditions met with in practice would cease to longer be a subject for controversy, and the ability to operate through any distance desired by this means the lightest or the heaviest switches, or the combinations of switches, with equal ease, is at once apparent, since their operation would involve, on the operator's part, only such muscular effort as would be necessary to shift the electric contacts by which their motion is indirectly affected, and incidentally such mechanical locking between levers as would by local conditions be required attached to them.

The use of selectors of the usual mechanical design would be avoided under such a system, as would also the objections common to them.

The use of switch and lock movements would, however, be retained and their use would be extended on all switches operated, owing to the fact that switch locks and detector bars constitute attachments essential to the proper protection of every switch, and that this device affords the simplest means of operating the switch and these appliances by a simple acting cylinder.

Some positive means must be provided, however, of detecting failures of switch and lock movements to respond fully to the motion of the levers operating them, when these movements are not shifted mechanically by the levers, since the nature of the power and the appliances used for shifting them otherwise is necessarily of an elastic nature, and, were precautions not provided for preventing it, a full movement of the lever might be made without the switch necessarily responding. Such a movement of the lever would (through the mechanical locking of the machine) release the levers which control signals leading over the switch operated by it, and if the latter failed to respond, disaster might result. To prevent this condition, the switch lever may be arranged to shift the switch completely by a partial lever movement; its complete movement, then, at that stage, being prevented by electric locks, engaging it and so controlled by the switch that until the latter has fully shifted the locks will not release the lever.

Switch and lock movements operated by air pressure, from levers so controlled, may be used with greater safety than they are when shifted mechanically by levers which have no other means of detecting failures of the movement to properly shift, than that furnished by the operating rods connecting them.

The precautions cited as essential to the safe operation of switches by compressed air also apply to a like operation of signals, and the many advantages of the electrical method by which both may be controlled when so operated will become apparent with a clearer understanding of the means through which it is accomplished in the electro-pneumatic system.

[TO BE CONTINUED.]

* Continuation of a series of articles published in 1899, as follows: May 12, July 21, Nov. 10, Dec. 1.

Signaling as it is and as it Might Be.

BRIEF HISTORY OF SIGNALING.

BY A. H. RUDD,

Signal Engineer, Hartford Division, New York, New Haven & Hartford.

The first known fixed signals for land work in America were two lights displayed from the belfry of Old South Church, Boston, forming a "distant signal," and indicating to Paul Revere "proceed to the homes." From his time until the close of the Civil War, the subject was little thought of here, although in England as early as 1844 the dangers of time spacing were recognized and on some roads block sections of varying length were established, protected by semaphores, communication between towers being effected by the needle telegraph and in some cases by bell code. The operators were instructed, but not forced by any mechanical or electrical device, to restore the signals to danger after the passage of each train, establishing in effect the telegraph block, as it here exists to-day.*

As early as 1865 a number of "turn towers" were installed on the Philadelphia & Reading. These towers were located always on sharp curves, at the point of intersection of the tangents, being often several hundred feet from the track, but giving the engineer a good line of sight in a clear atmosphere. A large fan arrangement on top of the tower revolved, displaying red until a train had passed out of sight of the operator, at all other times showing white. While most of these devices have been supplanted by automatic signals, two of them still remain in service.

Omitting (as they are not properly block signals) any description of the banners, balloons, Dutch clocks, flip-flops, red balls, windmills and various other fantastic and unique shapes, varieties and systems (?) of signals, some of which are still extant, we find that in 1866 Thomas S. Hall of Connecticut began work upon an automatic block indicator. In 1871 he installed a crude but ingenious apparatus on the New York & Harlem, and the Eastern (now the Boston & Maine), operated on an open circuit. After a number of years of constant labor and many improvements he evolved the "banjo" signal of to-day, in which a closed electric circuit is employed to raise a disk, so that any broken or crossed line wires or defective battery will allow it to drop by gravity and indicate danger; this circuit being opened at a relay by the passage of the train.

In place of track instruments, whose treadles were depressed by the wheels of passing trains, and which if broken or set too low would not operate, we now have track circuits which keep the signal at danger as long as a pair of wheels is in the block; while non-fusing relays, with lightning arresters, guard against sudden heavy currents. This system appears to be capable of but little farther development.

On February 1, 1881, the first patent was issued to George Westinghouse, Jr., for electro-pneumatic signals. This was followed by five others to him and two to other parties during that year; also two reissues and three new patents, prior to 1887, in which year Mr. Westinghouse took out ten additional patents on these devices. The system has since been constantly improved by employees of his company, and to-day the automatic block semaphores, notably on the Pennsylvania Railroad, give evidence of its perfection. The first signals of this class were installed in 1882. In recent years a number of other devices have been evolved, and some are being perfected, but the results achieved by the two above noted and their extensive use warrant us in taking them as examples of American practice.

No successful automatic systems, I believe, have originated abroad. Although automatic signaling has thus far made little or no progress outside of America, there is still the possibility of a wide and profitable field for American inventions.

In manual controlled block signaling, however, English inventors were early in the field, the Sykes system being perhaps the most widely adopted and best known among them. This device was brought to our shores about 1882, but had several defects, chief of which was the lock falling free by gravity, instead of being pulled out by the electric current; there was also the liability to unlock by the action of lightning or by crosses of foreign wires. Here

* In fact the principle of the telegraph block system appears to have been fully recognized by the English as soon as the telegraph was put in use, and experimental block signaling is reported as early as 1839.

again our inventors set to work and the Patenall and Union lock and block instruments are further proofs of their ability and perseverance.

The electric train staff was originated in England and improvements on it or useful additions to its facilities have been devised in this country.

At the present time, however, many of our large roads, as a matter of economy, or for other reasons of policy, cling to the time interval as a method of spacing trains, and the following incident actually occurred on a large double track line not a thousand miles from New York, as late as 1887. On a day of extra heavy travel Father Time was represented by section men stationed at convenient intervals armed with five minute sand glasses to mark the fleeting minutes and with red flags in lieu of scythes, with instructions to display the latter as soon as each train passed, turn the glass, and stop all trains until the sand ran out. The first *down* special passed a timeboard, indicating that the preceding train was over an hour ahead, only to be stopped by the next red flag. An examination of the glass showed that the sand had run about two minutes. "Where is the other train?" thundered the Superintendent, who was aboard. "Just gone up, sor!" That block station was abolished, the flag was replaced by a pick, and the "aisy job" discontinued for the day. This line now has a complete block system, and trains are not stopped by the propinquity of those on the opposite track.

In interlocking, Great Britain was in the lead for many years. Our first machine was devised and installed by Messrs. J. M. Toucey, General Superintendent, and William Buchanan, Superintendent of Motive Power, of the New York Central & Hudson River at Spuyten Duyvil Junction, N. Y., in 1874. It was replaced in 1888 by a Saxby & Farmer machine of American make. In 1875 the Pennsylvania Railroad imported from Saxby & Farmer of England a complete plant for Newark Junction, N. J., and soon after erected a large tower at Broad Street Station, Philadelphia. The elevated railroads of New York City were also early in the field.

With the exception of the Pennsylvania, few roads accomplished much until 1887, when the persistent efforts of the Railroad Gazette and other agencies in calling the attention of Managers to the advantages of these devices began to bear fruit, and improved financial conditions began to permit their adoption.

Until 1888 the Union Switch & Signal Co., successor to the original Jackson Manufacturing Co., dominated the field, furnishing a modified Saxby & Farmer machine, and employing the old gridiron flop locking. In 1888 the present Stevens locking, with patented swing dog special, was invented by Mr. J. T. Hambay. Soon the Johnson Railroad Signal Co. entered the field, putting on the market the Johnson machine, which was patented in 1885, 1888 and 1892, and using vertical locking invented by Mr. Arthur H. Johnson. Later the National Switch & Signal Co. was organized, languished a while, was reorganized, then absorbed the Johnson Company and was in turn amalgamated with the Union Switch & Signal Company, leaving as its record of contribution to the general good the National machine, with its beautiful special locking. This also is of the vertical type, and was patented by Geo. H. Pfeil in 1892.

During the later period of the above changes in organization the Standard Railroad Signal Co. entered the field, and in 1896 the Standard machine was put on the market, with locking designed, I believe, by Messrs. Henry Johnson and John T. Cade. Meanwhile the Hall Signal Co. was pursuing the even tenor of its way, confining itself to the manufacture and sale of the electric signals only.

Under the head of interlocking machines to be used with switches and signals worked by other than manual power, there is first to be noted the electro-pneumatic, manufactured by the Union Switch & Signal Co., brief mention of which has already been made in connection with automatic block signals. The first machine (1876) was purely pneumatic. The electro-pneumatic was tried in 1877. Also, the hydro-pneumatic was developed, and quite a number of plants of that kind were installed up to and including 1890. In 1891 other experiments were made with the hydro-pneumatic.

In 1892 the electro-pneumatic, with many improvements, was brought out, and in 1893 the patented Hambay tongue locking was adapted to this machine, and substituted for the purely electric locking which was in vogue up to that date—a great step in advance. In 1897 the final mechanical locking was used in this machine, and other improvements were made, the result being the electro-pneumatic machine which is the standard to-day. Recently, also, power machines operated wholly by compressed air, or entirely by electricity, have been devised, and a few installed, but they can hardly be said to have as yet passed the experimental stage, although they also will doubtless be rapidly perfected, and much may be expected of them.

Thus, after early struggles against adverse circumstances of every sort, obstacles seemingly almost insurmountable in the way of defects in the systems themselves, new conditions to be met in every installation, lack of financial support, narrow markets and infinitesimal returns, which only those men who bore the brunt of these burdens can ever realize, the American systems of to-day are established; and their universal adoption must be only a matter of time.

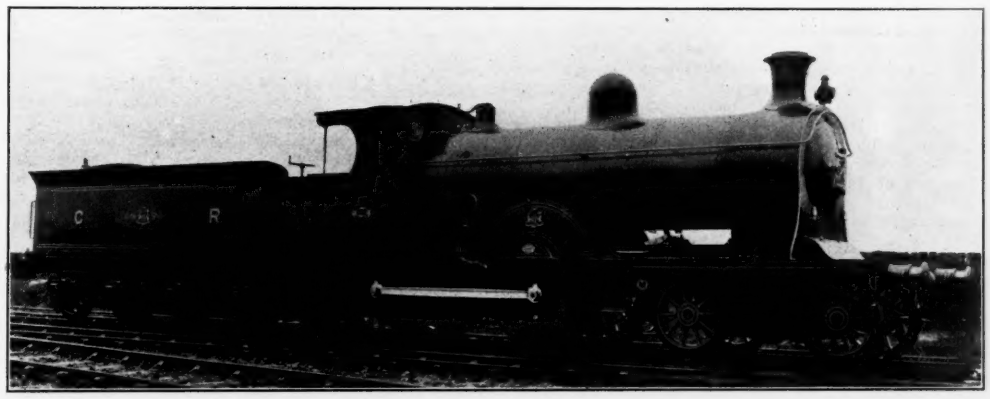
When the history of this work is some day written, the names of a score of modest men, little known at present outside their own small circle, will be honored as the pioneers of a science which has added as much as any single branch of engineering to the safety of passengers and property. It is this science or art that has made possible the tremendous increase of train manipulations at great terminals; the decreased safe time interval between trains, and the consequent increased capacity of the lines; and the greatly enhanced peace of mind of operating officials.

Signaling is a science not at present appreciated at its true value by one manager in a dozen, nor by one of the general public in ten thousand, because they do not understand it in detail or adequately appreciate its difficulties, its demands upon the men who pursue it (compensated in large measure though they are by the fascination of the study), or its great and absolute advantages to the railroads themselves, through safeguarding traffic and rendering possible its advantageous increase. But in the near future interlocking and block signaling will receive due credit, for it will be seen that traffic may be doubled, yes, quadrupled, by the use of signals.

[TO BE CONTINUED.]

Eight-Wheel Express Engines for the Caledonian Railway.

An eight-wheel engine has recently been built at the St. Rollox Works of the Caledonian Railway Company, intended for heavy and fast service. It is built from the designs of Mr. J. F. MacIntosh, Locomotive Superintendent of the Caledonian, whose reputation as a locomotive designer is not confined to his own country, engines built after his plans being in use on the State Railroads of Belgium. On the Caledonian is a combination of heavy and fast trains with heavy grades, and the weight of the West Coast expresses increases year by year, as is common experience in our own country. These new engines have been brought out to meet these conditions. The principal dimensions and weights are given below. These engines are fitted with steam sanders, Westinghouse brakes and apparatus for steam heating of the trains. An engraving is shown, from a photograph.



Eight-Wheel Express Locomotive for the Caledonian Railway.

Cylinders	19 x 26 in.
" c. to c. of	28½ in.
Wheels, diameter, truck	3 ft. 6 in.
" " driving	6 ft. 6 in.
Boiler, center above rails	8 ft.
" diameter of barrel	4 ft. 9½ in.
" thickness of plates	7/16 in.
Firebox, length	6 ft. 11 in.
" breadth	4 ft. ½ in.
" depth, front	5 ft. 9 in.
" " back	5 ft. 3 in.
" thickness of plates	5/8 in.
Tubes, number	269
" length	11 ft. 7 in.
Heating surface, tubes	1,462 sq. ft.
" " firebox	138 sq. ft.
" " total	1,600 sq. ft.
Grate area	23 sq. ft.
Steam pressure	200 lbs.
Weight on driving wheels	79,963 lbs.
" of engine	115,808 lbs.
Tender, tank capacity	4,125 gals.
" coal capacity	5 tons
" wheels, diameter	3 ft. 6 in.
" weight	100,800 lbs.
Total weight of engine and tender	216,608 lbs.

Packing and Lubrication.

At the last meeting of the New York Railroad Club the discussion of the evening was on the subject of lubrication. In the course of the talk Mr. Waitt told something of the recent instructions put in force on the New York Central & Hudson River Railroad. We print below, in full, the general instruction circular No. 2, issued Jan. 1 of this year, governing the practice on the New York Central system.

Passenger Equipment Cars.

Packing.—The journal boxes in passenger equipment cars belonging to this company are to be repacked with waste saturated with winter oil each year, beginning the work on the 15th day of November and completing it as quickly as possible after that date.

All good, clean waste removed from the boxes at this time will be used again in repacking, after having the summer oil thoroughly squeezed out by pressure, and after it has been resaturated with winter oil.

In addition to the above repacking, all passenger equipment cars will be repacked when passing through shops for general overhauling, all waste in the boxes being removed, and that which is good and clean being resaturated.

In repacking boxes, preferably, new waste should not be used alone, but should, where it is practicable, be mixed with the old, the two being mixed in the proportion of one-half old and one-half new.

When the boxes are repacked, tin tags (1 in. x 3½ in.), having stamped on them in ½-in. letters and figures, the station abbreviation for the place where repacking is done, together with the month and year, are to be attached to two opposite inner corners of each truck frame. The tags applied when the boxes are repacked with winter oil are to have four dots marked after date, thus: M. H. 12-99. : : These tags will indicate to foremen and others at terminal yards where repacking is done, whether the boxes have been repacked within the specified time, and whether they have been repacked with winter oil after November 15, and will prevent any duplication of work. The tin tags should be painted standard truck color.

Oiling.—All through passenger trains on the main line will be oiled at New York and Buffalo, and on the West Shore at Weehawken and Buffalo, and no oiling at intermediate points will be done, except in case of warm or hot box, or other emergency. Journal box lids should not be opened at intermediate points unless box is found to be above running heat, as indicating by feeling it with the hand.

All local and branch passenger trains and cars not in main line or through service between New York and Buffalo are to be oiled once in every 3,000 miles run, the date of oiling all cars in such trains to be marked on the under side of the side sill over each truck, giving the month and day of the month.

In case of cars having no regular run, inspectors are expected to use their judgment in seeing that they are given sufficient oiling when at their station, care being taken to avoid using oil unnecessarily, and when such cars are oiled, the month and day of the month is to be chalked on the under side of the side sill over each truck.

Master Car Builders and Division Superintendents of Motive Power in charge of car work will assign the terminals at which regular oiling of passenger equipment cars in local and branch trains will be done, and they will file with the Assistant Superintendent of Rolling Stock a statement of such assignments.

Freight Equipment Cars.

Packing.—All freight equipment, work train and miscellaneous cars belonging to this company are to have all the waste removed from the boxes, and the boxes repacked, whenever they are placed on shop repair tracks for repairs. All waste removed that is good for further use is to be picked apart and resoaked in the tanks provided for saturating waste. Such waste is to be saturated in oil for not less than forty-eight (48) hours, then drained, after which it can be used again in repacking boxes in freight equipment, work train and miscellaneous cars. Such waste removed from the boxes as is found poor and dirty, is to be placed in proper receptacle and later is to be burned up.

The above practice of repacking boxes of cars placed on repair tracks is to be carried out at inspection points to as great an extent as possible consistent with the surrounding conditions.

All cars received from connections at interchange points, also all cars set out at stations where inspectors are located, and all foreign cars placed on shop repair tracks, are to have the lids of the journal boxes opened and the packing put in proper condition to run over this company's road without question, unless it is already in such condition. Well saturated packing only is to be used and applied in the boxes for this purpose. If in such cars the packing is found very dry, and not in good shape to carry the car over this company's line properly, it is all to be removed and the poor packing thrown away, and such as is good saved and resaturated for future use. The boxes from which packing is removed should be repacked carefully with freshly soaked packing. In addition to putting the packing in good condition, an examination must be made to see that the journals, journal bearings and keys are in proper condition.

Caboose cars are also to be taken care of by the use of saturated packing, in the same manner as other freight equipment cars. The boxes are to be examined after each trip, and when needing oil are to have saturated waste applied. This should not ordinarily be required more than at intervals of once each month.

In treating boxes having a sufficient quantity of packing, but which are lacking in oil, a small amount of

the packing is to be removed from the sides of the box, enough to give place for the saturated packing which is to be applied, care being taken to apply the saturated waste so that it will come in direct contact with the journal where it will do the most good.

Oiling.—All through freight trains on the main line are to be oiled at New York, Weehawken, West Seneca, East Buffalo and Suspension Bridge only, except in emergency cases, and no oiling at any other point is to be permitted. The oil can will not be considered a regular part of the equipment of freight car inspectors and repairers, except at the above mentioned points.

Whenever it is necessary to put a journal box in good condition, either on account of box being hot or warm, or on account of lack of oil or packing, it is to be done by using well saturated waste.

Passenger and Freight Locomotive Tenders.

The packing and oiling of passenger and freight locomotive tenders is to be done in the same manner as for passenger cars, except that the tin tags required for passenger cars are not to be applied on the tender trucks; but each Division Superintendent of Motive Power will require reports of repacking to be made to them of all tenders on their respective divisions, and will see that the requirements as to packing and oiling are being strictly carried out.

Engine Driving and Truck Boxes.

Packing.—When packing driving or truck box cellars, freshly saturated packing which has been pulled apart in small bunches is to be placed in them moderately tight, to avoid settling away from the axle, which would occur in a short time by the jarring effect produced by the speed of the engine, if not packed sufficiently close. Care is to be taken in this packing to pack it evenly, so that proper lubrication of the hubs will be made. Frequent difficulty is caused by the packing not being in contact with the hub.

At intervals of once each week for passenger locomotives, and once each two weeks for freight locomotives and switchers, the packing in the cellars is to be carefully examined, and the packing spoon run through between the packing and the lower side of the journal, and by this means press the packing down slightly, then introduce a small quantity of freshly soaked packing in the space on top of the old packing. The old packing having thoroughly settled, the freshly soaked packing that has been added close to the journal will effect good lubrication.

In the examination of box cellars at engine houses the packing in the cellars is not to be removed unless the journal has been running hot, in which case it is to be removed if found necessary. Under all ordinary conditions, however, the packing is not to be removed.

For the passenger locomotives the cellars are to be examined specially each day, with a view of ascertaining only whether they are in proper condition and are being properly lubricated. In this examination the packing is not to be disturbed, or any oil added, unless it is actually necessary.

The top of the driving and truck boxes are to be packed with a good quality of white or colored cotton waste, well saturated with oil.

The top of the driving boxes are to be examined daily to insure top of box being properly covered with packing for preventing admission of dirt through the oil holes in the box; this packing is not to be disturbed except by the engineer when oiling, or when doing work on the engine, making it necessary, in which case great care is to be taken to avoid getting the dirt which accumulates on top of this waste, on top of the box or in oil holes.

Oiling.—All driving boxes and engine truck boxes on engines in all classes of service are to be given oil as frequently as deemed necessary in the judgment of the engineer. Sufficient oil is to be used to keep the waste properly saturated during the trip, and not enough used to cause it to be wasted or drip on the ground.

Method of Packing Passenger and Freight Cars and Locomotive Tender Boxes.

In packing boxes, the first portion of waste applied is to be wrung moderately dry and is to be packed moderately tight at the rear end of the box, so as to make a guard for the purpose of not only retaining the oil, but excluding the dust as well. Care is to be taken to keep the waste at the side of the box down below the bottom of the journal bearing about an inch, and also to have that portion of the waste in front end of box separate and distinct from that which extends from the front end of the journal to the back of the box. This will avoid derangement of the packing in the rear of the box. The roll of packing which is placed in the front of the boxes is not to extend above the opening in the front.

At terminals or yards where journal boxes require special attention to the packing, the following practice is to be adopted:

A packing knife or spoon of standard style is to be used to ascertain whether the packing is in the proper place at the back of the box, and to loosen up the waste at the rear and side of the journal. This particular treatment is given to prevent glazing of the packing (which occurs when it is in too long contact with the journal), and at the same time to put the packing in proper place at the rear of box. It is desirable to give this treatment at intervals of 500 miles run for cars and tenders, if possible.

A small quantity of packing is to be removed from the sides of the journal when found not in a good condition, and this replaced by similar quantity of well soaked packing.

When packing is removed from boxes it is to be placed in a bucket provided for that purpose and not thrown on the ground. The portion of the packing not fit for further use is afterward to be separated from the good and disposed of as directed. The good to be resaturated for further use.

No box is ever to have oil applied before packing is properly loosened up on the sides and back of the box with packing iron.

Before applying a bearing to a journal the surface of the bearing is to be examined to insure that it is free from imperfections of any kind that will cause heating. The surface of the bearing is then to be oiled or greased before it is placed on the journal.

When applying wheels or axles, the journals are to be examined to insure their being free from any imperfections which would cause heating.

When wheels or axles are carried in stock, the journals should be protected with a good material suited to protect the surface, without hardening, and which is not difficult to remove.

When the journal is found heated and there is a good supply of packing in the box, it is evidence of some imperfection of journal, journal bearing, box, or wedge, and the bearing is to be removed, provided the box is heated to such an extent as to require repacking of the box. Boxes which have warmed up slightly will, in most cases, by partially replacing with freshly soaked packing, give better results than by entire removal of packing from the box. When it is necessary and permissible to oil boxes, it should be as short a time before leaving time of the train as possible.

Preparation of Packing.

When preparing packing, the dry waste is to be pulled apart in small bunches, and any hard particles in it removed. Each bunch is to be loosely formed to facilitate soaking and packing, as in this form boxes can be packed in a more satisfactory manner and with less waste of oil. This loose, dry packing is to be put in soaking cans or tanks provided for that purpose, pressed down moderately tight, then covered with oil and allowed to remain at least forty-eight hours. After being saturated for this length of time the surplus oil is to be drained off, leaving it then in proper condition for use in packing boxes. Standard equipment for saturating and draining packing is to be provided at all points where packing is to be kept for use, unless suitable equivalent is already in use.

All new saturating and draining boxes or tanks are to be made in accordance with standard drawings, which will be furnished from the Mechanical Engineer's office.

When the winter oil is received and sent out, instructions are to be issued calling in all of the summer oil which is in stock at the various outlying points. This summer oil is to be kept at the shops stored until the 1st of March, when it can be redistributed and used.

Ordering Oil.

In ordering oil for lubrication of journals, winter oil of zero cold test is to be provided for use during the months of December, January, February and March and the last half of November.

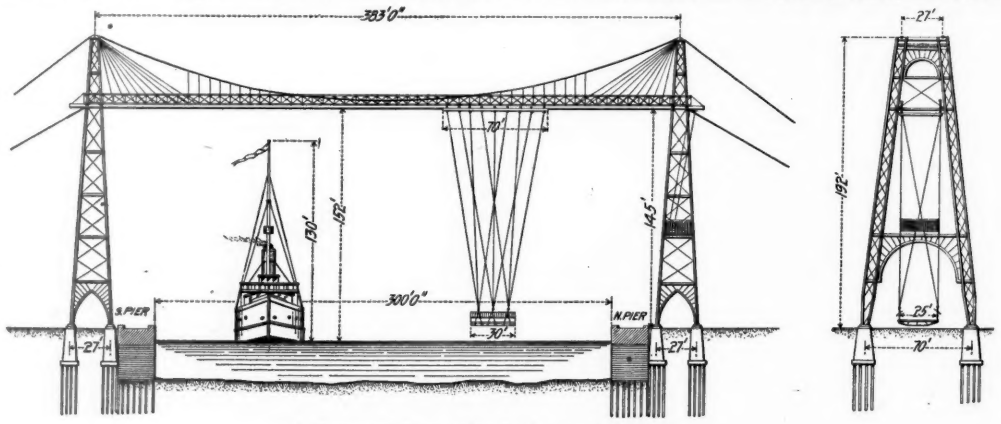
The ordinary grade of summer oil can be used for the balance of the year.

A Suspended Bridge at Duluth.

The engraving shows a structure proposed to bridge the ship canal at Duluth. The problem there is to build a bridge which shall not interfere with the free passage of ships to and from the harbor, and, as the reader knows, various solutions have been offered. The one now proposed is an adaptation to the local conditions of the bridge lately built over the Seine at Rouen from the designs of a French engineer.

This Duluth bridge is, as may be seen from the engraving, trussed girders carried on towers and having 152 ft. of clearance between the lower chord and the water. These girders are mainly supported by cables, the whole structure being, in fact, a very stiff suspension bridge. On this bridge will be rails on which trucks will run; from these depend cables, which in turn support a car hanging at the street grade. This car will serve as a ferry for the street traffic, both team traffic and foot traffic. The traveling trucks will, of course, be driven by electric motors, the current to be supplied from the city power house.

The Mayor of Duluth is in correspondence with the Engineer Bureau of the War Department concerning this project, which is the suggestion and design of Mr. T. F. McGilvray, City Engineer.



A Proposed Suspended Bridge at Duluth, Minn.

Experience in the Motive Power Department.*

(*Continued from page 36.*)

The principal question at the front just now is the general one of compounding locomotives. We have two-cylinder compounds, and four-cylinder compounds may be either tandem or have one cylinder above another. Of course, the justification for compounding locomotives is that by doing so we expect to do our work on the railroad with less fuel and less water; but the contention was made for some time that we would have to pay the penalty when we came to settle our bill for repairs. But the tide has turned after an experience of eight years and it has been stated under excellent authority by a representative of the Chicago, Milwaukee & St. Paul road, which has had a large number of compound locomotives in service, that an analysis of its locomotive repair account has brought out the fact that the repairs of the compound engines were 17 per cent. less than the repairs of the simple engines. Now, there is more mechanism about the cylinders of a compound engine than about the cylinders of a simple engine, and it could not be expected to accomplish any saving there, but the saving is in the boiler and firebox repairs. In a compound engine the exhaust is so softened that the fire burns more evenly and quietly, with less chances of holes forming; the result is less expensive repairs are required.

The claims of compounding for freight, passenger and switching engines may, I think, be stated in this way: That for freight engines the economy is established, whereas the economic results from compounding passenger engines is not so certain by any means, this being especially due to the fact that it is difficult to always get maximum loading in both directions in passenger service. As regards compounding switching engines, I do not know that such a thing has ever been done in the world with the single exception of the New York Central switching engines at the Grand Central Station in New York City. That station is surrounded with built up property, and the occupants of those buildings are a very critical class of people, and they complained of the noise of the exhaust of the switching engines at the Grand Central Station. The authorities had one switching engine made compound, and, of course, that softened the exhaust perceptibly; so much so, that a second compound switching engine was ordered; but that is the only justification that I know of for compounding a switching engine.

In designing an engine, after the general proportions of the different parts are determined, the next most important item is the valve motion. The best accepted practice to-day is the use of the Stevenson link valve motion conjoined with the piston valve. I think it may truly be said that the success of the piston valve in locomotive practice was practically demonstrated by its successful use on the Vauclain four-cylinder compound. That engine was introduced in 1891 and there probably must be something like two thousand of them in service at this time. When they were first introduced the mechanical wiseacres predicted that disaster would follow from the use of piston valves. As a matter of fact there is not a single part of the four-cylinder compound locomotive which has met all the demands of service so successfully as the piston valve; the result is that locomotive designers are now frequently specifying the piston valve for simple engines.

There are a great variety of valve gears used on locomotives, and some of them are not worthy of mention. The French have the most unsightly valve motions, but, fortunately, we have not many such in this country. The principal valve motions which are in use in different parts of the world are the Stevenson, the Walschaert and the Joy. You do not see many Walschaert and Joy motions in this country, although you can see some on a summer afternoon if you take a trip to Coney Island. In England there are quite a number of Walschaert and Joy gears, but more in the nature of experiments than accepted practice. But when you get to South Africa, which I had the pleasure of visiting two years ago, you find there a large number of engines with outside valve motions. I soon discovered the reason, for while in England the railroads are all standard gage, yet in South Africa the roads are all 3-ft. gage, and that almost forces them to use some outside motion, and the Walschaert motion fills this requirement very nicely. In Russia, which I also visited after the South Africa trip, I observed a large number of engines with outside valve motions.

*Extracts from a lecture by Mr. R. H. Soule at Purdue University.

Again, there was a reason, and it could not be the same one as in South Africa because the roads were all 5-ft. gage, but, owing to the severity of the climate and the fact that the ground is deeply covered with snow and ice during most of the year, there is a great deal of hostility among the enginemen in regard to the use of inside valve motion, as it involves going under the engine for inspection or repairs; therefore, they largely use outside valve motion. In Russia the Joy motion is used on the Government lines and the Walschaert on the private lines. Why that distinction is made, I do not know. . . . In this country the general opinion is that the Stevenson gear has more real merit than any other, and will survive the longest in locomotive practice. . . .

In speaking of what might be called the aesthetics of locomotive design, it is entirely fair to say that the English lead the world. We are now producing some locomotives which compare very favorably with English designs, but the people who absolutely bring up the rear are the French and the Belgians, who seem to produce the most hideous engines conceivable. Although we concede the palm to the English in the aesthetics of locomotive design, I think, nevertheless, that America leads the world in the design of of locomotives, if, as is proper, efficiency and economy are the principal criteria.

Passenger and freight car design was described at considerable length, but what was said about steel car construction, we believe is of most general interest.

There is a tendency to make freight cars now of all steel. I am of the opinion, however, that the best solution of the matter is to make what might be called a composite car, that is, use a steel construction for the underframe and trucks, and a wooden structure above; as long as wood is as cheap as it is in this country, a wooden superstructure is more economical than one of steel. I believe there is likely to be a reaction from the present frame for all steel freight cars. On the Norfolk & Western, they are building one thousand hopper-bottom cars of 100,000 lbs. capacity, and the construction is, as I have described, steel trucks and underframes and wooden superstructures, and the Vice-President of that road told me last June, after I had examined a sample car, that they fully expected to be able to produce those cars at $200 per car less than if made of all steel.

Now as regards maintenance of equipment, there must be a system of bringing engines and cars into the shop uniformly at proper times, for repairs. Locomotives according to the best practice, are shopped by mileage in combination with their reported condition. Passenger equipment cars are usually shopped in reference to their exterior appearance and the observed condition of their paint and varnish; the exterior surface of the car deteriorates with service and exposure to the weather and if the passenger equipment is maintained with reference to its exterior condition, doing what else is necessary when cars are in the shop, the passenger equipment is maintained in a business like way. The best practice is to have a general car inspector whose business it is to personally observe and examine all the passenger equipment cars and keep a record of them, showing what cars are in a condition to shop. Then it remains for the executive officer to order the cars in. Freight cars are maintained on quite a different basis, because the greatest wear and tear of freight cars is in their trucks and draft gears; and so, by common practice, freight cars are inspected at all division and terminal points and inspectors have the responsibility of shopping cars that are in need of repairs. Of course, light repairs can be done out of doors, but heavy repairs must be done at the shop. Each point on a railroad where freight cars are apt to accumulate sends in a daily report showing the number of cars that are waiting repairs. These reports are all transmitted to the motive power office and the Superintendent of Motive Power has a daily summary placed on his desk, and then it is his duty to watch the matter and take such action as is required by the circumstances. He can often do something to relieve one congested point by transferring cars to some other point where there is no congestion. In addition to this, it often happens that the transportation department feels a pressure for some particular kind of a car, say a box car. Then the Superintendent of Motive power will receive instructions to give preference to the repair of box cars, and he will then give instructions accordingly. At other times there will be a shortness in coal or coke cars.

The best policy in this matter of maintaining an equipment of a railroad is to have everything working in such a ship-shape way that all the equipment will be shopped at just the right time; that is, not shop it too soon and still not so prolong its service to a point where the property will deteriorate. In connection with any general plan of maintaining the equipment of a railroad, an important point is never to lose an opportunity to introduce improvements; as time goes on we adopt improved details, and it becomes a matter of very nice judgment and great care to have everyone so drilled that, as the equipment is shopped, advantage will be taken of the opportunity to strengthen the parts which are weak or perhaps to put on improvements which will result in increased economy of operation or maintenance.

Another point in connection with the economical maintenance of equipment is that it is important for the mechanical department to make a special study and see how far and to what extent the variety of details can be reduced by adopting different designs. On one railroad that I was connected with we took up, for instance, the problem of locomotive pilots and we found that we had nine varieties of pilots in an equipment of 426 engines, but by taking a sheet and sketching up the front ends of the several classes of engines, and by a process of fitting and trying, we were able to produce two designs of pilots which would apply to all the engines on the road. A similar study reduced the number of driving boxes from six to three and the number of freight truck brake connections from five to one; and it sometimes happens that this steadily pursued policy of improvements and betterments will bring attention to the fact that a car has such good running gear that its capacity can be increased by raising its sides and ends, and a great deal of useful work can be done and is being done in that way.

Another very important thing is the performance of locomotives and cars. In the matter of the performance of locomotives, the Superintendent of Motive Power watches his repair account, which shows the cost of repairs by the mile run. Then, of course, there must be records showing the performance in the way of the amount of coal burned, and the number of pounds of coal used per mile run. But there is a decided tendency now to make this showing on the basis of coal consumed per ton mile, making the actual work done the unit and the basis of reference rather than the actual distance traversed. Then, similarly, the cost of lubricants used on locomotives is a matter of special record. I recall the railroad on which, when the matter was first taken up, the statistics showed that the cost of lubrication amounted to $1.87 per thousand miles. This included both the cost of the lubricating oil for the machinery and the cylinder oil which went into the cylinders of the locomotives. By keepink that matter persistently in mind, in the course of a year, the cost figures were brought down from $1.87 per thousand miles to 83 cents per thousand miles, which was a very decided gain. And as an illustration to show what great progress has been made by our railroads, I will say that about twenty or twenty-five years ago the Boston & Providence Railroad was using for lubricating its locomotives pure lard oil which at that time cost a dollar a gallon, while the Norfolk & Western is now using an oil which costs five cents a gallon. It surprised me, when I first became acquainted with the fact, to know that the lubrication of a passenger equipment car only amounts to about seven cents for a thousand mile run, and in a freight car it is only four cents and a half for a thousand mile run. . . .

A modern railroad must have provision at all its division and terminal yards for testing the air brakes of its cars, both passenger and freight. The result is that each such yard must have a system of piping arranged with convenient connections, so that connection can be made with any train, brakes applied and necessary adujstments made, and everything put in working order. . . .

Perhaps just a little ought to be said about the management of men. If any of you come to occupy executive positions you will realize that that is one of the important problems. When I speak of the management of men I do not mean simply the men who do the work, but I mean the whole organization. I think the greatest requisite to get good results on a railroad is that your written instructions should be unmistakably clear and explicit, even at the risk of being lenthy. A manufacturer in an ordinary shop can explain things personally, but on a railroad, that is impracticable. Your instructions must be clear and explicit so that it does not require any subsequent questions or consultations to interpret them.

And that brings me to what may be called the talent for organization, and which does not mean simply what officers to have and what titles to give them, but it means the cultivation and the practice of the best methods for handling complex problems. It is always puzzling to know how to proceed with new and complex problems, and the man who knows how to meet them most quickly and efficiently is the man who has the talent for organization in the greatest perfection. When it comes to dealing with men directly, I think the most important thing of all is to have the men realize that their management is in sympathy with them. The average workingman will appreciate that more than anything else; if the rank and file are satisfied that the management means right, and if they can fall back on the conviction that their officers are actuated by a spirit of fairness. It is useful and valuable when serious matters are in controversy for the officers to come into direct contact and to come right down face to face with the men who have these grievances which they wish to have adjusted; but at other times, when everything is smooth sailing, everything should be handled through the regular official channels.

I wish to encourage those who may be intending to enter the railroad profession, and I think it can be truly said of it that the railroad profession will bring a man into contact with a greater variety of experiences than any other profession, and it becomes proportionately interesting on that account. Now, as regards the process of fitting yourself for the serious work of life later on, I think the best advice I can give is to be very thorough in all investigations and studies and to cultivate the practice of not despising details, because when you get into practice later on and become successful engineers, you will surely find that there will come a time when the pressure of business in general will make it practically impossible for you to spare time to go into details, and your salvation, if you want to be thoroughly posted men, is to do that in the early part of your career. Another important thing, though perhaps it is less necessary to mention it here than anywhere else, is the importance of being close observers of practice while you are studying theory. I would advise you to extend and cultivate the habit of being close observers of practice in general; you will certainly find such a habit to be of inestimable value as time goes on. And I think that you can also derive a good deal of benefit by cultivating the habit of studying what is called by the librarians "fugitive literature," which means literature which is not embodied in books, but in catalogues, leaflets, etc., but they contain useful information which you cannot obtain from any other source, and if you will make an effort to give to that class of literature the attention which it deserves, I am sure that you will be benefited. I have had a good deal to do with draftsmen and have had charge of two or three large drafting rooms, and have also been able to look at the drawing-room problem from the standpoint of the motive power department, and the one thing which will place you in the front rank is the habit of rapid work; because railroad officers and managing officers of industrial establishments are busy men and when they want anything they want it quick, and when you are asked to lay out some problem, the quicker you get it laid out the better. A very good thing is to keep a pocket note-book. I would also cultivate the habit of not taking notes in too much detail, because, if you only put down a few skeleton facts, and then, within twenty-four hours, transcribe them into another book, you will then cultivate two very important faculties. You will cultivate the faculty of correct perception and you will also cultivate the habit of correct memory, and you will be very much benefited.

Chicago Drainage Channel.

The official opening of the Chicago Drainage Channel was hastily effected about 11 o'clock Wednesday morning, January 17th, the permission of the State authorities being received by telegraph. The movable dam at Lockport was lowered, admitting water into the tailrace and the Desplaines River. As on the occasion of turning water into the Channel, January 2, there was no ceremony and the step was taken with some secrecy to prevent stoppage by injunction.

On the same day, but as it happened after the opening of the Channel, two suits were brought, one in the Supreme Court at Washington by the State of Missouri to enjoin the operation of the canal, and one in the United States Circuit Court at Chicago by the city of St. Louis; the claim in both cases being that the water supply of St. Louis will be seriously impaired by Chicago sewage.

So far as it can now be told, the controlling works and movable dam at the lower end of the Channel work satisfactorily and the current in the Chicago River is about as anticipated. While the first object of the Channel was to divert the sewage of Chicago from Lake Michigan and so improve the water supply of that city, it is also planned to make this part of a deep waterway between the Great Lakes and the Mississippi. It is proposed to petition Congress to carry out this scheme by improvements in the Illinois River which are estimated to cost about $25,000,000. So far about $33,000,000 has been expended on this Channel.

The special committee of the Chicago City Council has reached an agreement unanimously approved by the Drainage Board, which provides that all water power generated at Lockport be transferred to Chicago at $4 a horse-power a year for 75 years, payments to begin July 1, 1901. It is estimated that from 23,000 to 25,000 h. p. can be developed along the line of the canal which will ultimately be increased to 40,000 h. p. The contract provides that the city can use the power for municipal purposes only, and cannot sub-let any of the power without the approval of the Drainage Board. The necessary plant is to be built by the city and on the expiration of the lease the wheels and wheel bits become the property of the Drainage Board. It is estimated that the plant will cost between $3,000,000 and $4,000,000, and it is to be built under the joint supervision of Chief Engineer Randolph and City Electrician Ellicott, the work to begin within 90 days and to be completed by July 1, 1901. The water at Lockport reached the level of the Chicago River and Lake Michigan on Jan. 13.

The Arnold Magnetic Clutch.

Some years ago Mr. Bion J. Arnold of Chicago invented a magnetic clutch, shown in the accompanying engravings, a number of which are in constant use. Properly speaking, his device is not a clutch, but is simply two very heavy discs made of metal having a high permeability and fitted with magnetic coils, which serve, when the current is turned on to magnetize these discs, which are thus drawn into very close contact and held there as long as current flows through the coils. Magnetic action alone, however, is not relied upon to keep the surfaces from sliding the one on the other; the contact surfaces being rough, the pressure caused by the attraction between the two plates prevents any slipping, and it is only a question of making the discs large enough to transmit the desired amount of power.

Diameter, 100 in.

Fig. 1.—Magnetic Clutch for Transmitting 3,000 H P.

The energizing circuit is controlled by a switch put at any convenient place. It thus becomes possible in throwing a generator in or out of service to control it entirely from the switchboard, where all the regulating devices and measuring instruments are within the reach of one attendant. These clutches are neat in appearance and compact in design. The illustration, Fig. 1, shows the largest magnetic clutch yet built. It is 100 in. in diameter and is capable of transmitting 3,000 h. p. at 150 revolutions a minute. This clutch is one of three now in use connecting the engines and generators in the central station of the Imperial Electric Light, Heat & Power Co. at St. Louis, a view of the machinery in which is shown in Fig. 2. We are told that experience with this plant shows that this form of clutch is applicable to the very large machines now being installed in power stations.

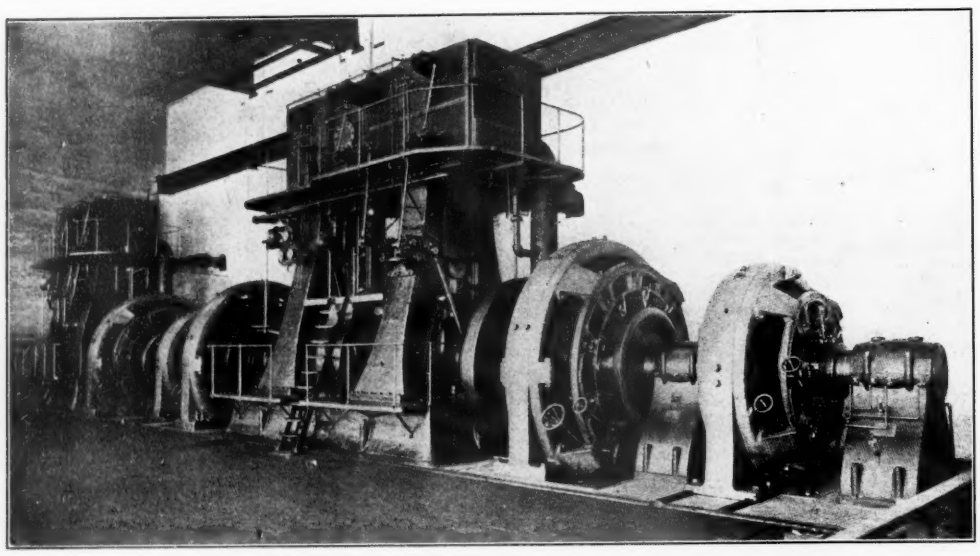


Fig. 2.—Magnetic Clutch Connecting Engines and Generators.

It has been proposed to use a clutch of the type shown in the illustration to serve at the same time for the fly wheel of the engine, thus making the weight and cost of the engine unit, fitted with magnetic clutches, but little more than the weight and cost of the small installation fitted with ordinary mechanical couplings.

The current is carried to the clutch coils through contact rings on the side of the clutch, and carbon brushes held by insulated brush holders.

This clutch requires no more than would be used by four 16 c. p. incandescent lamps, and the loss in the clutch due to the continuous use of the electric current, while the machines are being run, amounts to about one-hundredth of one per cent. of the power transmitted.

Although these clutches were intended for use principally in connection with the Arnold system of power station construction, they have been adopted for other purposes. A number have been made to connect large synchronous motors to their load in such a way that they can be quickly disconnected in case of accident. They have also been built for use on ordinary line shafting.

The Cost of High Speeds.

Last week (page 37) we gave a short summary of a paper on this subject by Mr. F. A. Delano, Superintendent of Motive Power of the Chicago, Burlington & Quincy, which was read before the Western Railway Club; following are extracts from the discussion:

Mr. F. A. Delano: Nobody has ever really shown what it costs to carry a passenger, or to carry a ton of freight; all that we have been able to do is to show what the average cost is. Now the question I ask in this paper, "What does it cost to run trains at high speed?" might be dismissed by a great many by saying, "Well, there are so many elements in it that simply cannot be fixed that it is unanswerable." It seems to me that we ought at least to get together all the data we can bearing on the subject, with a view to approximating an answer. With that in view I divided the subject under six headings, and there are two other items that I thought of since writing the paper, that I will just mention in the hope that somebody else here will dwell on them a little more at length.

In order to make an engine for high speed service we must have large boiler capacity, and to carry that large boiler we do not want many drivers, and we want a large-wheel engine. That means, of course, a heavy load per wheel. A high load per wheel means high strains on structures of all kinds and on the track. That means increased capital invested not only in expensive engines but in more expensive bridges and tracks.

Another item is the dead weight carried per paying passenger. Going very cursorily into this matter, I find that in the electric street cars the load per passenger varies from 750 to 1,750 lbs. In railroad operation I find that statistics of a number of roads show the dead load per ton of paying freight is about four to one, that is, four tons carried for every ton of paying freight and although that is a pretty good showing I think many roads would not show as well. This is an average for a large road west of the Missouri River. In passenger business in a number of cases four or five tons per passenger are carried on important trains, and in special mail trains there are something like 25 to 30 tons of dead load hauled for every one ton of mail.

The only reason I mention this is, that if we are accelerating the service, one thing that we find is that we must increase the weight of the motive power at the head end of the train, and we must decrease the weight of the trains; in other words, the ratio between the live load to the dead load is lost in two ways, both by having to use a heavier and more powerful engine to get the boiler capacity, and by having to decrease the train behind.

Mr. G. R. Henderson (Asst. Superintendent of Motive Power, Chicago & Northwestern): Mr. Delano's points are all very well taken, and I do not intend to dispute any of them. In regard to the expense of material, etc., I will say that we have in the last month burned expensive material for high speed trains on account of difficulty in getting suitable coal. Now when we get coal that is very fine, we fork it over and shake it before it is put on the tender, and of course the high speed engines get the coal that is forked, and the freight engines take what is left, and there is a great deal always that is left. Before we used these forks there was so much trouble with the coal that we actually had to adopt the practice of putting three men alonside the tenders of fast trains to pick over the coal and put it in by hand, so as to eliminate the slate. Another point is the increase in the oil used on these fast runs. I do not mean to say that there is any actual necessity for it, but as a matter of fact, on some of our particularly fast runs we notice that the men use from two to three times as much oil as they do on the regular runs. There is another point that the motive power officers recognize in regard to high speed and that is if there is any delay, a slow speed train can very easily make up the time, but if a high speed train loses a few minutes and tries to make up the time, it is then that engine failures come in, and we are asked at the end of the month why we have so many engine failures. In regard to the extra danger of collision, of course we all know that the effect of a collision is in proportion to the square of velocity. A point that impressed me is the fact that the great number of trains that have to be side-tracked to make room for the high speed train is going to increase the consumption of coal on these other trains, which will be due necessarily to the high speed trains. If a train is side-tracked for a high speed train, we will have to burn coal while lying on the side-track which brings in no return, and then if we attempt to make up time we will have to burn much more coal to get a higher speed.

Mr. F. H. Clark, Mechanical Engineer of the Chicago, Burlington & Quincy, presented the following figures in support of the statement that the fuel consumption is materially affected by increases of speed. These are the averages from six months' records of trains handled by class "H" mogul locomotives.

No.		Speed M. P. H.	No. Stops.	Mileage.		Coal used—tons.		
Train.	Cars.			Train.	Car.	Total.	Per day.	Per car.
A	6.76	31.33	18	34,480	233,802	1151.8	6.36	170.38
B	6.24	35.70	8	34,480	215,110	1111.4	6.14	176.11
C	2.95	45.40	7	34,480	101 525	1091 7	6.03	369.83
D	3.88	48.00	7	34,100	132,240	1274.1	7.12	328.35

Mr. J. F. Deems (Master Mechanic Chicago, Burlington & Quincy): Is it not a fact that with these high speed trains, we are keying up everyone on the line to a much greater extent than we know, and to a much greater extent than it is possible for us to ascertain definitely, and do we not get in return almost as much as these trains cost us? Now every one knows that with the increased speed of trains there has been a corresponding decrease in the number of wrecks. Whether it is due to the increase of speed or not I am not prepared to say, but I am inclined to think it is. Now it is not due to the increased speed itself, but to the fact that the men, realizing the danger, and realizing the importance of these trains are more careful, and they are in better mettle and they do better work than they used to when running 15 to 20 miles an hour; and that is the fact that occurs to me, whether there is not an element in that line that perhaps compensates fully for what we lose in running these high speed trains.

Mr. H. D. Judson (Superintendent, Chicago, Burlington & Quincy): Mr. Deems has touched upon the fact that we perhaps gain in vital force. It is a question with me whether we do not lose, whether we do not become unduly nervous. There is just one point that I would like to call attention to, and that is the fact that in freight service the excessive speed at which we are required to run obliges us to haul less tonnage. We frequently run our cattle trains now at such speed that we cannot haul anywhere near the tonnage that we do of other freight. I hope that railroads will some time get together on the question of a maximum speed. We will assume perhaps that we cannot reduce the speed of passenger trains, but why should we run every freight train at such an excessive rate of speed? If there is a traffic officer here he will bear me out in the statement that in the matter of freight transportation we have come to a point now where a man says, "If you cannot get my goods to me by next morning, I will try some other road;" and it has come to be not only livestock and merchandise, but every car of junk has to be handled in the same way.

Mr. W. H. Marshall (Superintendent of Motive Power, Lake Shore & Michigan Southern): I realize fully the advantage of having definite figures on the

cost of locomotive expenses in handling trains. I feel, however, that if we do obtain definite information on this point, it still leaves almost every case as a special one to be decided by itself, and the cost of operating from a mechanically economical standpoint is probably a very small factor in the total problem. The points that Mr. Delano has brought out in his paper I think we will all concede, but when a fast train is to be operated it is quite a different problem whether you are going to operate just a few fast trains, or whether the entire passenger service is to be operated upon a comparatively fast schedule. We all know trains that are scheduled at 35 miles an hour can make speeds very much higher than is necessary, or a fifty-mile an hour train, provided that the train can go along without any detention. But they have to encounter the many little things on the road that cause slow-ups. The Lake Shore has a great many comparatively heavy trains; they are not very fast, as fast trains go, they seldom have more than 40 miles an hour speed, but they have, as you know, until recently been operated by comparatively small engines. When I went there it was a matter of astonishment to me to know that the engines could do such work, and looking over the situation, I have come to the conclusion that it is very largely because the trains require very little acceleration after they are once started, it is simply a question of keeping them going for 30 or 40 miles at a stretch. Undoubtedly the engines are too small for the work, but an 18 x 24-in. ten-wheel passenger engine with a 68-in. driver and 190 lbs. steam pressure can handle an eleven, if not thirteen or fourteen-car train at a schedule of 40 miles an hour; you apply that to the average railroad, and you can not do it.

I think in this fast work there is much more power consumed in the constant acceleration of the trains, either because of breaks or delays, or because the man slows up on account of the signal being located at such a point that he dare not approach it at full speed, and all these things we are experiencing with fast trains.

Now in solving the problem, if the railroad company, instead of putting on enormous engines, will endeavor first to eliminate all these delays from the road, everything that prevents the operation of fast trains, I think that every dollar that is spent in that direction reduces the expenses of operation of freight trains as well as passenger trains, and will certainly pay. That will be one of the incidental advantages, perhaps, of the fast passenger trains. I want to say that we have nearly reached the limit in the size of our engines.

Mr. G. W. Rhodes (Assistant General Superintendent, Chicago, Burlington & Quincy): I think it is a little remarkable that at a meeting of the Western Railway Club there is not one present who has been able to answer Mr. Delano. I think that one of the things to do is to let every operating officer when he proposes to increase the speed of freight trains to say just what it is going to cost in dollars and cents in making that increase. My experience has been on some lines, that if you get one fast train on, that brings up everything else fast. The fact of the matter is, that if you get a fast freight train on the road and then attempt to run some slow freights, you will find you can operate more successfully if you disregard cost entirely by keeping everything moving fast. I know that in some investigations we made on the C., B. & Q. we found that was actually the practice, when we wanted to see why our pay roll was increasing, we found everything was running fast on account of a few fast trains, but how much more it was costing us we had not any data to show.

The data that Mr. Clark has given cover different classes of passenger trains of different weights, some of them stop at many stations, and others do not, and therefore this is not a satisfactory comparison. We know in a general way that it costs more to run at high speed than it does to run at low speed, but how much we do not know, and I would think that it would pay the railroad companies well to take a given tonnage and run that over the road, keeping actual records of the results, and then we would know whether it is going to pay us to run dead freight trains as fast as stock or fast meat trains.

Prof. W. F. M. Goss (Purdue University): There is one question that interests me a great deal, which has not been touched upon here, but concerning which we have no information, so far as I have followed the discussion. It is, what power is developed by these large engines at high speed? The presumption conveyed in the discussion several times is, that with a given engine when the schedule is increased the engine is worked at much higher power than before. Now is that true? I do not believe it is. You have trains working, say at 30 miles an hour, and your engine is doing the business. You increase the schedule to 40 miles an hour, or to 60 miles an hour, and the engine does the business in both cases. I believe in both cases the engine is working at full capacity; I think we have the same power to take a heavier train with the engine going slow as going fast with a lighter train. That is, with the simple locomotives; when you come to large locomotives that question is different.

I mention that, because in the discussions we are trying to account for the increased fuel consumption at high speeds by saying that the engines were less efficient at high speed. I very much doubt that proposition. I believe when we come to 30 or 40 miles an hour we are working under conditions that are pretty nearly maximum conditions, and that increasing the speed to 60 miles does not decrease the efficiency of the locomotive.

A statement was made before the New York Club, not long ago, that a locomotive had been run, or made to develop a horse-power for every square foot of heating surface in the boiler. I rather doubt that statement. I do not believe that we have yet reached the point where locomotives will sustain the power equivalent to the heating surface of the boiler; that is, a boiler having 1,500 sq. ft. of heating surface can not develop 1,500 horse-power under even ordinary locomotive service. That was substantially the statement that was made.

Now concerning the indirect means of approaching some measure of power, I believe that under ordinary conditions of service a locomotive may be expected to give a horse-power for from 26 to 29 pounds of steam per hour. I think there is not much more than 10 per cent. error in that, and we might be much nearer if we would attempt to estimate the power of the locomotive by dividing the weight of water evaporated per hour by 28; that would give us a horse-power less than 10 per cent. in error, provided the locomotive is in good condition. If we reduce this, it would be equivalent to the gallons of water consumed per hour divided by 3.4.

Now we could go still further and make an assumption of boiler efficiency and then base an estimate of power on the coal consumption. This of course leads us into a little longer labryrinth and the result would be more gross than that which I have already suggested, but at the same time I think the result would fall within an error which would not be greater than 20 per cent. It applies only to simple engines. The rule of power based on coal would be something like this: The horse-power developed in the cylinders equals the pounds of coal consumed per hour divided by 5 or 6; by 5 if the coal is of superior quality and by 6 if of inferior quality.

Cooke Consolidation for the Louisville & Nashville.

The engraving from a photograph shows a consolidation engine recently built by the Cooke Locomotive & Machine Company for the Louisville & Nashville Railroad. The order was for five engines and the shipment has just been completed. The descriptive specifications follow:

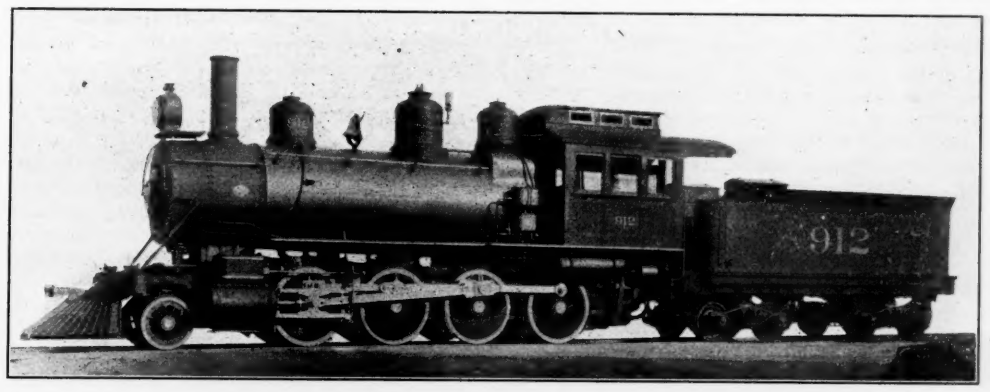
Cylinders	21 in. x 26 in.
Weight on drivers	139,000 lbs.
Total weight, working order	156,000 lbs.
Loaded weight of tender	89,000 lbs.
Driving wheel base	15 ft. 11 in.
Driving wheels, diameter	52 in.
Driving wheel centers, material	4 cast steel, 4 cast iron
Truck wheels	33 in.; Paige steel tired
Driving axle journals	8½ in. x 10 in.
Truck journals	5½ in. x 10 in.
Boiler type	Belpaire
" working pressure	175 lbs.
" horizontal seams	quadruple riveted
" diameter, first course	66 in.
" thickness of shell	⅝ in.
" fire box length	122⅝ in.
" " width	33⅜ in.
For soft coal	Rocking bars
Tubes, number	224
" diameter	2¼ in.
" length	14 ft. 0 in.
Heating surface, tubes	1,834 ft. 0 in.
" " fire box	188 ft. 0 in.
" " total	2,022 ft. 0 in.
Grate surface	28.4 sq. ft.
Slide valve, pattern	L. & M. RR. balanced
" " travel	5¾ in.
Steam ports, with	1⅛ in
" " length	19 in.
Exhaust ports	2⅝ in. x 19 in.
Lap of valve	⅜ in. inside lap, ⅞ in. outside lap
Exhaust pipe	High single nozzle
Center of boiler from rail	8 ft. ⅛ in.

Tender.

Truck,	Arch bar, combination bolsters
" axle journal, diameter	4¼ in. x 8 in.
Tank, water capacity	4,500 gal.
" coal capacity	8 tons

Special Equipment.

Boiler shell steel	Carbon
Driving wheel tires	Latrobe
Injectors	Monitor
Steam gauges	Ashcroft
Sanders	Watters
Springs	Pickering
Boiler lagging	Sectional magnesia
Couplers	Curtis Swing head
Brakes	New York air brake
Fire box steel	Carbon
Lubricators	Nathan
Safety valves	Coale
Whistles	Cooke L. & M. Co.
Bell ringers	Bartow
Piston packing	U. S. metallic
Brake beams	Sterlingworth



Cooke Consolidation Locomotive for the Louisville & Nashville.

Typical Box Cars.

A committee of the Central Railway Club was instructed to bring in a report to be discussed at the meeting of January 12, on "Typical Dimensions for Standard Box Cars." The report is in part as below:

We find box cars of comparatively recent build, having inside dimensions varying in length, width and height, respectively, from 34 ft. to 54 ft., 8 ft. 2 in. to 9 ft., and 7 ft. 6 in. to 10 ft. 2 in. . . . The dimensions proposed by the American Railway Association are: Length inside, 36 ft.; width inside, 8 ft. 6 in.; height inside between top of floor and underside of carline at plate, 8 ft. The maximum clearance dimensions of some of the more prominent roads are as follows: at a height of 12 ft. 3 in. width must not exceed 9 ft. 7 in. . . .

There is an objection to the height dimensions, to obtain which, without exceeding the limits of clearance above referred to, requires lowering the floor frame. In steel frame construction this is not a matter of any importance, but with wood sill cars it is an undesirable form of construction, as it necessitates locating the center line of coupler through end sill, thereby materially weakening that member and making the draw gear parts less accessible for repairs.

From a mechanical point of view, having in mind the above clearance dimensions, the following dimensions would seem to be the most desirable: 36 ft. long inside, 8 ft. 6 in. wide inside, and 7 ft. 9 in. high between the top of floor and underside of carline at plate.

Consideration has been given to a length of 34 ft. The next most desirable length is 36 ft., both on account of securing floor timbers in merchantable lengths with a minimum of waste material and in obtaining floor space for additional row of casks.

From an operating standpoint, the floor space must be considered more in connection with the loading of 50 gallon casks than any other class of freight. A width of 8 ft. 6 in. will allow 4 casks to stand on end across the car; the casks measuring about 2 ft. 1½ in. in diameter. When full space is given for a row of casks across the car, there is less liability of bulging doors and sides of cars by reason of wedging action of casks, due to shifting of load. A width of 8 ft. 6 in. would, therefore, seem to be very desirable. A length of 36 ft. will accommodate 17 rows or a total of 68 casks, which a 35-ft. car will not do. Hence, in advancing from 34 ft., the next most practicable size is 36 ft.

For height, all that is available up to clearance limits is desirable for all classes of package freight. The loading of grain is also facilitated by high carlines, permitting the loading of cars to full capacity with little or no trimming of load. With a height exceeding 7 ft. 6 in. two tiers of casks can be loaded with ease, and grain and coal from spouts can be distributed over the car to good advantage. The clearance dimensions, 9 ft. 7 in. width, at a height of 12 ft. 3 in., we believe should not be exceeded, as a standard car should be applicable to all roads. We therefore would recommend the substitution of the dimensions 7 ft. 9 in. in place of 8 ft. for height; the other dimensions to remain as proposed. . . .

We believe these dimensions suitable for cars of 60,000 lbs. capacity, and for roads that can utilize them, for cars of 80,000 lbs. capacity, as well. The Committee consisted of Messrs. H. F. Ball, H. H. Perkins, J. R. Petrie.

There is one of the largest passenger stations in the world in Cologne, and some German engineers still regard it as the most complete structure of its kind. It was completed but a few years ago, and already traffic has increased so that sometimes three trains have to lie on the same track, one behind the other, and a long platform completely outside of and beyond the train-shed now is the regular starting point for certain trains. It is a question of putting a roof over this platform, which, projecting from the magnificent building, will have something like the effect of a corn-crib attached to the Capitol at Washington.

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to improvements. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Passenger Train Speeds.

Those who have heard or have read Mr. Delano's paper and the discussion at the last Western Railway Club meeting will observe the general lack of definite information on the cost of running fast trains. Furthermore, the paper had to do only with passenger trains, the vastly larger question of an economical speed for freight trains being only briefly mentioned in the discussion.

Two weeks ago we pointed out that in freight service the big economy of slower speeds seemed to be principally that one locomotive can haul more tons; that from this will come a reduction in fuel, in wages and in other elements of cost. That is, of course, an entirely different matter from the one treated by Mr. Delano, which is the increased cost of high speed passenger and mail trains. But in the absence of exact information, we are inclined to think that a number of items of cost which Mr. Delano mentions as greater for higher passenger speeds may really be offset in one way and another, so that the net saving attending a reduction in passenger speeds from 60 to 30 miles an hour might not result in any very important difference in the actual cost of hauling trains; excepting possibly where two trains had become necessary to handle the required number of cars. What saving there might be would rather come about indirectly through the longer life of track and bridges and machinery, and smaller maintenance charges, and in any case the net possible gain would be small relatively to the direct gain that might be got by a slower movement of freight trains.

Judging from the Baldwin Locomotive Work-trains resistance formula and other data, it was thought that the fuel consumption per car or per ton increases about directly as the speed. But if this were so, the same amount of coal would be used to run a given distance, either at 30 miles or at 60 miles an hour, as in the latter case, although the fuel rate is doubled, but half the time is required to make the run. The chances are that the fuel consumption of locomotives built for moderate speeds varies at a rate somewhat greater than the first power of the speed between the limits of 30 and 60 miles an hour, but modern high-pressure locomotives especially designed for fast running, having large boilers, large grates and large driving wheels, are certainly more efficient in fast work than earlier locomotives, and the fuel consumption should be proportionately less. Probably, as was suggested, some fuel might be saved indirectly by reducing passenger speeds, freight and other trains laid out by fast trains being obliged to burn more coal to make up time, but this is assuming that there would be fewer delays.

There can be no question that the first cost and maintenance charges for track, bridges and rolling stock are greater for fast passenger service than for trains run at moderate speeds, but the risk of accidents and greater chances for delays may be offset largely by the greater vigilance of all departments, better materials and construction and increased efficiency of operating officers. It is a question whether a good deal is not gained by a few fast trains in the way of keeping everyone awake.

Should it be found from definite data that taking all things into account it would pay railroads to reduce the schedule of fast passenger and mail trains, it is doubtful whether any general plan of reductions could be carried out. But as suggested by Mr. Marshall, a good deal can be done in the way of reducing the time lost at stations, and in slowing for crossings and badly located signals, so that such fast running will not be required between stations.

How Well Do Your Trainmen Know the Rules?

The Transportation Committee of the Superintendents' Society made at the last meeting an interesting report on examination of railroad employees, the substance of which was published in our issue of October 13. The suggestive feature of this report is the declaration of the committee that it is sufficient to test a man—a brakeman, for instance—on a small portion of the rules; to adopt, in fact, the method universally employed in schools and colleges, of judging a candidate's qualification on the whole of a subject, by the intelligence and knowledge which he manifests in answering questions on a small part of it. A prominent member of the Society challenged this view, and we think that he is right. Quite likely the writer of the report may also be in some degree right; he may have had in mind men whose knowledge had at some previous time been tested more or less thoroughly, and may have incompletely expressed his thought. But if we are to consider the whole of a trainman's or station man's education, we cannot overlook the admitted fact that the 100 or 200 rules which make up the guide of conduct that a trainman must conform to are each, at one time or another, of vital importance; whereas a student in college may be ignorant of a precept of mathematics or a rule in language with no worse result than that he will have to make up for the deficiency at some future time. Still, the examination of trainmen by the common method, of beginning at the beginning of the code and going through to the end (unless the examiner's patience weakens, along in the region of the hundredth rule), has proved irksome to so many trainmasters and others who have made examinations, that any suggestion whatever, which is recommended as an improvement, will probably be welcomed. If the committee's suggestion is based on a sufficient body of experience, the members will want to hear more about it.

If we take a survey of the railroads of this country as a whole we find this matter of catechetical examination in a peculiar condition. On many smaller roads there is nothing worth the name; on the great majority it is decidedly inchoate, and on a few it is attended to with care and thoroughness. One superintendent who has given close attention to this matter for 15 years, says that he regards a train-rule school as more important than an air-brake school; and his arrangements for giving instruction bear out his statement; but on most roads, if we may judge by the practice, the opposite view is held. The management apparently believes that the train rules can in some way be got inside the men's craniums without any formal procedure, while air-brake schools are maintained at large expense.

The salient fact shown in the Committee's report is that many superintendents believe a train-rule school necessary (on the same ground that an air-brake school is necessary), but that there is no agreement as to how frequently the men should attend such a school. And probably there is as much diversity of view concerning the details of the teaching as concerning the times or frequency of sessions. Is anything like uniformity possible? We think every superintendent or trainmaster who has had extended experience in examining men on the whole code and has used a printed catechism or printed guide of any kind is convinced of the value of such examination. Of those we have talked with, all believe in questioning more, rather than less; and those who have tested their men's knowledge less frequently than it ought to be tested, because of engrossment with other duties, generally throw upon some superior officer the responsibility for not allowing sufficient time to make examinations. And this grudging of the needed time is what leads to the employment of partial examinations, with the attempt to make such take the place of thorough work.

From the Committee's point of view, it is the examination of men who have been a considerable time in the service that is chiefly to be considered. It is important to bear this in mind. As to getting a satisfactory test of all new men, probably all superintendents who have given the subject attention are pretty well agreed. But men in active service need to be tested. There are those who did not do as well as they ought, in their original examination; and others who have a strong propensity to make rules for themselves and never get beyond the need of an occasional reining up. A third class, those who wish to brush up their knowledge of fine points and learn from the experience of their fellows, includes many of the best men, and ought to include all, of whatever quality.

There appears to be a general agreement that examinations are, or can be made, valuable to the employer, whether the answers be satisfactory or partly unsatisfactory, and whether the standard of marking be severe or otherwise; because they stir up the men to do a lot of thinking. If the "classes" are judiciously arranged, a session of an hour or two will greatly stimulate the interchange of views between those who are already mentally alert, and those of the same occupation whose activity in this direction is yet to be developed. There should be no indulgence in the feeling that a trainmaster's time is too valuable to be spent in such work. We commend the position of a superintendent who recently remarked that, rather than omit thorough instruction, he would let the trainmaster devote his whole time to the work, and he (the superintendent) would get along without his services in other work.

Keeping in mind the desirability of stirring up men to active thinking now and then, we are inclined to agree with those superintendents who think that six months, rather than a longer time, is a suitable interval between examinations. Those who favor asking questions on a few rules as a test of knowledge on the whole are certainly right in their claim that book-examinations, however extended, can never be warranted to give an absolute test. This being so, the most practicable means of "checking up" the examinations is to repeat them periodically; and by watching the results of greater or less frequency anyone can tell what are the needs of his particular case. The officer who thinks three rules out of a hundred sufficient to question a man on, will discover his error, if he be in error, by repeating the test a few times, and can then deal with the individual employee accordingly. The officer who tests all his men on all the rules every six months will soon find out whether he is wasting his time.

It is necessary to keep in mind (if not to publish) the difference in the experience of different men. A freight conductor who has been in that position five years cannot fairly be dealt with on the same basis as one who has been running only six months. The fact that some conductors and enginemen who have been long in the service, making fair records, are found to have large chunks of ignorance in some of the corners of their brains, has sometimes led a short-sighted trainmaster to the conclusion that it is right to lump all his men together, in making examinations; but the true method, of course, is to treat these with special reference to their individual needs.

With all our teaching by precept we must not lose sight of the fact that all the older men have got most of their knowledge by experience; but, with things as they are, this knowledge, thus acquired, is liable to be found mixed with some error, and so the catechising of such men is likely to be more difficult than teaching new candidates. To get a man to unlearn what he has hitherto looked upon as solid truth is always a hard task; but it is one of the most common tasks that a trainmaster has to grapple with.

The foregoing generalities are laid before the reader chiefly for the purpose of drawing attention to the first part of the third paragraph. The questions suggested in that paragraph—In how much detail shall the teaching be given? Can one superintendent get material benefit from studying the catechism of another? How often should old conductors and enginemen be made to brush up their knowledge?—are now recognized as important. Superintendents who have investigated but have not done much, feel the need of giving continued attention to the matter; and those who have done the best work in the teaching line are found to be most desirous of making still further improvement. Teaching in an office has its limitations. No one expects it to take the place of out-door inspection by the superintendent and his assistants, and no one expects it to show those traits of character—such as the faculty of not getting "rattled" in emergencies—which not even a school-master, dealing with a pupil constantly for months at a time, would expect to discover except by actual experience. It will not always expose

the parrot-minds which can recite, but cannot execute. But as long as a manager entrusts the task of hiring new men to 100 or 500 different officers, and the supervision of those men, after they are hired, to from five to twenty-five division superintendents, there can be no question as to the desirability of some effective means of insuring consistency—not to mention strict uniformity—in the conduct of the multitude of men that must be employed on every railroad of any consequence.

Annual Reports.

Baltimore & Ohio.—The receivership of the Baltimore & Ohio ended on June 30 last, when the new company formally took possession of the property. The reorganization plan had been put into effect about a year before, and most of the exchange of securities effected; the receivers, however, continued in possession, and the annual report for 1899, now issued, covers the operations for a complete year of their management.

There was a large expansion in freight and passenger traffic; 17¾ per cent. in the former, and over 5 per cent. in the latter. Rates, however, were still further reduced, so that the change in gross receipts is not important, being only $682,000, or 2½ per cent. The improvement policy was continued, the increased charges for maintenance work accounting for nearly half of the increase of $1,507,000 in the operating expenses. The larger business was done with more economy than in the previous year, the expense of transportation service in fact increasing only $825,000, or 7 per cent. With an increase of over 775 millions in ton-miles, freight train-miles increased only 5½ per cent. The heavy drop in the average freight rate, nearly 15 per cent. for the year, to 3.90 mills, against 4.58 mills in 1898 and 5.2 mills in 1897, caused a reduction in the average freight train-mile revenue of 5 per cent. to $1.34. The general results of the year's operations on 2,047 miles of line are shown below in comparison with the returns of 1898 and 1897:

	1899.	1898.	1897.
Freight earnings	$20,055,664	$20,000,215	$18,336,852
Passenger earnings	5,650,664	5,247,159	5,059,002
Other receipts	2,698,594	2,475,414	2,186,269
Total gross income	$28,404,922	$27,722,788	$25,582,123
Operating expenses	21,783,323	20,276,091	20,012,094
Net earnings	$6,621,599	$7,446,687	$5,570,029
Miscellaneous income	855,290	1,017,447	1,040,716
Total net income (exclusive taxes)	$7,476,889	$8,464,134	$6,610,745

None of the other trunk lines gets so low a rate as the Baltimore & Ohio. The Pensylvania's ton-mile rate dropped just below half a cent in 1898; the Erie in 1899 got 5.17 mills and the Lehigh Valley 5.02 mills; all these companies doing a heavy coal business. The New York Central's rate in 1899 was 5.90 mills. The Baltimore & Ohio's neighbor on the south, and active competitor in soft coal, the Chesapeake & Ohio, received in 1899 on all freight, 3.62 mills; on seaboard coal 2.21 mills, and on other coal 3.55 mills, which is higher than was received by the Baltimore & Ohio, on its soft coal tonnage. This was carried for 2.64 mills in 1897, the figure being now reported for the first time. Bituminous coal now comprises over a third of the company's tonnage; hard and soft coal, together with coke, afford 55 per cent. of all the freight it carries. Of the total revenue tons moved, 25,057,000 in 1899, soft coal accounted for 9,051,000 tons, or 36 per cent. The increase in this tonnage in the year was more than half the total increase, which was 3,070,000 tons, or nearly 14 per cent. The total ton mileage was 775,126 thousands heavier, and the train load was 28 tons larger, bringing the figure up to 342 tons. The increase in freight train mileage was thus kept down to 5½ per cent., but the drop in rates was so great that the receipts per freight train-mile run decreased nearly 5 per cent., as stated above. Grain was the only important freight of which less was carried than in 1898, the loss being 275,000 tons, or 15 per cent. The increase of 296,000 tons, nearly 27 per cent., in castings and machinery, reflects the industrial activity of the year in striking fashion.

The construction and betterment work carried on called for an aggregate expenditure of $1,122,800, a little more than in 1898; of this amount $954,900 was provided out of the general treasury of the company, the balance by terminal funds and receivers' certificates. The expansion of operating expenses includes an increase of $449,600 (11.7 per cent.) in maintenance of way, and $162,025 increase in maintenance of equipment cost, or 4.9 per cent. The reorganization plan disposed of all the old equipment and wheelage trusts, special leased line equipment, etc., and brought all the equipment in service under the direct lien of the bonds and the ownership of the company. The equipment was revalued, and the charge as carried on the books reduced by $5,730,725.

The improvements carried out during the year may be summarized as including 681 miles of ballasting, 50 miles of new sidings, 47 new bridges and culverts and 64 others repaired or strengthened; 7,700 cubic yards of masonry built, besides a large amount of new fencing, etc. There were put down 52,113 tons of new rails, valued at $915,500.

The report contains a statement giving the earnings in the six months to December 31, to show the position of the new company, as now constituted, its fixed charges, etc. This is briefly as follows:

Gross earnings	$16,932,775
Operating expenses	10,770,142
Net earnings	$6,162,633
Less taxes and Wash. Branch net earnings	382,779
Balance	$5,779,854
Other receipts	413,880
Total net income	$6,193,734
Interest and rentals	2,992,221
Surplus	$3,201,513

These figures do not include the Baltimore & Ohio Southwestern revenue. The balance of $3,200,000 would provide the full 4 per cent. on the $60,000,000 of new preferred stock authorized, and a balance of $801,500 for the $45,000,000 of authorized new common. With its finances in an orderly shape, its fixed charges low, and a surplus balance, the new company has entered its new career with hopeful promises. The new interests which have been enlisted can do much to aid the company's success. President Hill, of the Great Northern, and the Chicago business men who have bought into the new company, can help it in the West, while it has the strongest financial influences in the East to support its plans. Moreover, the large interest in the stock which the Pennsylvania is understood to have acquired, will be a conservative influence to stop rate cutting. With the property in excellent physical condition, funds for further enlargements available as business grows, and stability in rates, the new Baltimore & Ohio has good promise of success. This is taken so much for granted, that the inauguration of preferred dividends is expected immediately, and Wall Street talks hopefully of even common dividends in the course of the year.

The two railroads which carry oranges and lemons from Southern California to the East have been having a great dispute with the shippers as to the routing of the fruit. If we may judge by the head lines in the California papers, there must have been great sums of money at stake, and the shippers allowed scores of carloads to stand on the side tracks for days rather than accept bills of lading under which the railroad could subsequently change its mind as to what eastern road the freight should be sent by. This right of choice was demanded so that the cars could be sent by the road which would furnish for them the most profitable return loads. The only reason for mentioning the matter here is to suggest the desirability of some means of putting a question of this kind before the public in a fairer light. It is not possible at this distance to judge of the merits of the controversy, for the railroads do not tell how much they lose by complying with shippers' wishes, and the shippers do not say whether it is a matter of money, great or small, or some other consideration that constrains them to insist on selecting their own route. If the fruit men are as much worked up as they are represented to be, it would be nothing strange to see them use their grievance as a basis for action in the legislature to punish the railroads for what they have done; and yet the railroads appear to be letting the newspapers go on as long as they please representing the railroad policy in this matter as outrageous; whereas, if we understand the matter correctly, there are good reasons for the course that has been taken, reasons which should appeal to any citizen. Why should not the railroad write to the newspapers and get for itself as good "display" in the columns of the local papers as is enjoyed by the other side? To explain matters to a few shippers and to give no information to other persons except through terse letters which, if published at all, are printed in the newspapers in small type without display, is to give the shippers an advantage. The merits of this controversy depend, no doubt, as in the cotton case in Tennessee, reported in the Railroad Gazette on June 30 last, on the difference in the rates between a route selected by the shipper but objectionable to the railroad, and one chosen by the railroad. If the shipper desires to have a particular railroad specified at the start he must, of course, expect to pay higher than if he leaves the question of route to be decided after goods reach the Mississippi River or some other eastern gateway. This demand on the part of the railroad is reasonable enough, per se, but the question is, how large a difference is it right to enforce? Probably a very small one would be objected to by the shipper, while the railroad, no doubt, makes a decided difference in order to surely turn the traffic in the desired direction. Of course, in the last analysis the shipper must have his way, if he is willing to pay a reasonable price for it, and if the railroad wishes to get him to give up his preferences without argument it should make him an appreciable allowance for the concession. We assume that that is what the Southern Pacific and the Atchison are doing in Southern California, but why should not this justification be made more public?

The output of the two great car building companies for the year 1899 was nearly four times as large as the total equipment of the four great trunk lines in 1870, and in a measure reflects the great prosperity of the country during the past year. The American Car & Foundry Company, in the ten months from its organization, March 1, reports an output of 50,000 cars, and the Pressed Steel Car Company 10,000 cars for the year. That the business of these companies has been conducted at a profit is evidenced by the net earnings. Those of the former company, for the first, second and third quarters of its existence, were respectively $658,816, $930,611 and $1,127,983. It has paid quarterly dividends of 1¾ per cent. on its preferred stock, and has reserved a surplus which has been set aside as a fund guaranteeing the payment of dividends on the preferred stock during the coming year. Orders already in hand for 1900 assure the running of the works to full capacity for months to come. The Pressed Steel Car Company, on a total business of $13,965,572 for the year earned net $2,237,104, out of which it paid dividends of 7 per cent. on the preferred and 6 per cent. on the common stock, and carried a surplus of over $600,000 to working capital. This company, with 16½ million dollars' worth of orders on hand, to be completed by June, bids fair in 1900 to double its record for the previous year, in which event, with the same proportion of net, its common stock will earn 22 per cent.

NEW PUBLICATIONS.

We have received the Proceedings of the Institution of Mechanical Engineers (London) for July, 1899, being the Plymouth meetings. One of the papers is a description of the South Devon Atmospheric Railway, preceded by remarks on the transmission of energy by a partially rarefied atmosphere. This is by Sir Frederick Bramwell, Past President of the Institution. Another paper is a description of the launch of a battleship, by Mr. T. R. Champness, Chief Constructor, H. M. Dockyard, Devonport. Still another is on "Railway Viaducts in Cornwall," by Mr. T. H. Gibbons, Divisional Engineer Great Western Railway, Plymouth. Other papers are "Mechanical Appliances to the Keyham Dockyard Extension," by Mr. Whately Eliot, Admiralty Superintending Civil Engineer; "The Machinery of H. M. S. Proserpine and H. M. S. Psyche," by Mr. Robert Mayston, R. N.; "Outlet Valves at the Plymouth Water Works," by Mr. Edward Sandeman, and "Refuse Disposal at Torquay," by Mr. Henry A. Garrett.

Third Annual Report of the State Board of Health of Massachusetts. Boston: Wright & Potter Printing Co., State Printers, 1899.

This report is for the year ending Sept. 30, 1898. It is a volume of 878 octavo pages with a large and thorough index. Among the papers of especial interest is one by H. W. Clark on "The Experiments on Purification of Sewage and Water Made at the Lawrence Station," carrying on the history of the admirable work which is being done at that station. Another special report is on "Filtration of Water," giving results ascertained at Lawrence. Mr. Clark also reports the results of an investigation of the action of water upon lead, tin and zinc, with special reference to the use of lead pipes. Stil lanother valuable special report is that of Mr. X. H. Goodnough, Chief Engineer of the Board, and Mr. William S. Johnson, Assistant Engineer, on "The Purification of the Sewage of Cities and Towns in Massachusetts."

The Journal of the Iron and Steel Institute. Volume XVI., 1899. New York: Spon & Chamberlain; London: E. & F. N. Spon, Limited.

This volume of the Journal of the Iron & Steel Institute (British) is No. 2 for 1899. It contains the minutes of the Proceedings at the Manchester meeting, held last August, with papers and discussions, and also the usual notes on the progress of the iron and steel industries.

TRADE CATALOGUES.

Axle Lighting and Refrigerating.—The Electric Axle Light & Power Co., 100 Broadway, New York, has issued a new pamphlet concerning lighting and refrigeration by the use of electricity generated by power taken from the axle. This company, as is well known, is the only one which has put out axle lighting apparatus in the United States on a large scale, having supplied many car equipments for the Atchison and a few for a number of other roads. It is not necessary for us to say anything about the company's apparatus, which has been repeatedly described in our columns. The new and most interesting matter mentioned in this pamphlet is the proposition to refrigerate by the use of electricity. The company controls what is known as the Ryan system of refrigeration. There is no description of the process other than that " the cars have no ice boxes . . . the refrigerant is cold, dry, desiccated air . . . produced by electricity taken from the axle of the car." The car carries storage cells and the refrigerating process goes on even while the car is at rest. Furthermore, there is a storage system using a brine compound, the brine being reduced to a temperature of 18 to 20 F. The weight of the apparatus is about 3,000 lbs. It is said that the cost of refrigerating under this system will not average

over 25 cents per car per thousand miles as against from $15 to $20 per car per thousand miles for icing.

Locomotives.—The Brooks Locomotive Works, Dunkirk, N. Y., send us a catalogue dated Dec. 1, 1899. The title page states that it is a catalogue of simple and compound locomotives and also that the annual capacity of the works is 400 engines. In compiling this new edition the aim has been to bring together information concerning the various types of Brooks engines, their construction and their performance and to show something of the recent advances in locomotive construction and design. Especial attention is invited to the Brooks improved piston valve, now in successful use on many engines. Within the last two years these works have added an erecting shop and have rebuilt and enlarged the boiler and hammer shops. They have put in electric drives for a large percentage of their machinery and have added electric, pneumatic and hydraulic cranes and tools.

The volume is introduced with a brief history and description of the works and a portrait of Mr. Horatio G. Brooks, who was born in 1828, served in the engineering and motive power departments of various railroads, in 1869 organized the Brooks Locomotive Works and died in 1887. As our readers undoubtedly know, Mr. Brooks was not only a good engineer and executive, but had an unusual interest in the welfare of his men, and his work in that direction endures to this day.

A chapter of two pages describes the piston valves designed and used by this company, and another chapter of seven pages describes briefly the two-cylinder and four-cylinder compounds. The body of the book is given up to numerous illustrations with the usual descriptive data of a great variety of engines. This covers 255 pages. Finally, there are tables of information, a cipher code and index.

The Charles A. Stickney Company, St. Paul, Minn., has issued a pamphlet descriptive of a new line of gasoline engines for railroad use. These are all of the vertical type. A combined engine and pump is made in various sizes from four to ten horse-power, the pump being mounted horizontally on the engine base and directly connected to the engine shaft by spur gearing and a friction clutch. Another arrangement is for deep well pumping where a slow speed gear carrying a crank pin is mounted on the engine base and connected to the engine shaft by a pinion and friction clutch; these also vary from four to ten horse-power. Gasoline engines alone are built with one, two or three cylinders. The single-cylinder type ranges from 4 to 35 horse-power, the double-cylinder type from 12 to 50 horse-power, and where three cylinders are used the sizes vary from 18 to 150 horse-power. The pamphlet also contains extracts from the paper on pumping plants for water stations read at the last meeting of the Association of Railroad Superintendents of Bridges and Buildings.

Concrete Mixers.—A catalogue has been issued by the Ransome & Smith Co., 149 Broadway, New York, describing Ransome's patent concrete mixers. The drum mixer, which is portable, is fed through an opening in one of its heads and the material after being mixed is automatically discharged through an opening at the other end. The continuous mixer automatically measures and feeds the several materials separately in the required proportions and then mixes them. The last few pages are devoted to testimonials from railroad officials, U. S. Army officers and others. A Ransome drum mixer built for the Chicago, Milwaukee & St. Paul was illustrated in Railroad Gazette, Oct. 14, 1898, page 741.

Locomotive Packings.—The United States Metallic Packing Co., Philadelphia, Pa., sends a very pretty pamphlet describing the locomotive packings made by that company. We discover the statement that this company has supplied over 100,000 packings for locomotives in the United States alone. Excellent illustrations show this company's packings applied to valve stems, piston rods and air pumps, and there is a fairly good statement of the theory and practice. Oil cups furnished by this company are also shown.

Twist Drills, Reamers, Chucks, etc.—The Standard Tool Co., of Cleveland, O., issues a new octavo catalogue giving engravings, price-lists and other information of the considerable variety of tools made by that well-known house. These include, besides twist drills and reamers, spring cotters, taps, flat spring and riveted keys, milling cutters and special tools. The New York office of the house is at 94 Reade street, and it has agencies in half a dozen foreign cities.

The Trunk Line Freight Classification.

Commissioner Goddard of the Trunk Line Association held hearings this week to listen to the complaints of shippers concerning the recent advances in freight rates. Messrs. Guilford, Prevost, Harriott, Murray, Childs, Caldwell and other high officers of the Trunk Lines were present at the hearing. There was a room full of representatives of the merchants, among whom were William R. Corwine (New York Merchants' Association), F. B. Thurber (National Board of Trade), W. P. Trickett (National Association of Freight Commissioners), E. P. Wilson (National Manufacturers' Association), A. M. Compton (National Merchants' Association), C. A. Jennings (American Cotton Oil Company), O. V. Dodge (National Association of Agricultural Implements), and H. W. Hoop (National Association of Confectioners). All but two or three of the speakers based their claims chiefly or wholly on the fact that the advances in rates recently made increased the differences between carload rates and those for less than carload. One speaker, Mr. P. H. Hanson of St. Louis, expressed satisfaction with the increased difference between C. L. and L. C. L., but the others argued in favor of giving retail merchants throughout the country the largest possible choice of markets.

A carriage builder of Cincinnati stated that an increase of about $16 a carload on carriages (from $34 to $50) from Ohio to the Mississippi River was likely to greatly curtail the sales of Ohio manufacturers, as the competition with local carriage makers in Western States was very sharp.

One of the most comprehensive statements made at the hearing was that of Mr. Thurber, who said:

I appreciate that to make a uniform classification which will fit all sections and all interests is almost as difficult a task as to make a suit of clothes which will fit every citizen, but it is equally true that the man who wears and pays for the clothes is entitled to a voice as to whether they do fit him or not, and this before he is dead, so that the railroads cannot advertise, like the undertaker, "no patron ever complained of my fit." The average railroad executive, like every other man, follows the line of the least resistance and yields to the most influential interests. It is less trouble and expense to carry in full carloads than in less than carloads, and the shipper of carloads, or multiples thereof, presses harder for advantages than the small shipper, and naturally gets an undue advantage.

The average railroad executive is apt to forget that he is performing a semi-public function—the furnishing of highways as well as selling transportation—and that the right of the citizen on the highway should come in to limit the law of wholesale and retail. He is apt to forget that there is such a thing as developing the few large shippers up to a point where they can virtually dictate their own rates.

This very thing has resulted in too low rates for transportation, upon the average, in this country, and an opposition from favored interests to so amending the Interstate Commerce Act as to give railroad corporations and individuals the same right of contract which all other corporations and individuals enjoy. The very low rates in this country inure to the benefit of the few rather than to the many, and there is room for reform, to the advantage alike of railroads and the public.

No fair-minded man questions the justice of the railroads getting higher rates than those which have been ruling, in view of the increased cost of most of the elements which enter into the cost of transportation, but to do it by indirection and without consultation with the interests affected, naturally evokes protest and strengthens the hands of the radical and socialistic element, who advocate the nationalization of all public utilities, before society has developed up to a point where such a proposition can be entertained by reasonable men.

Some years ago (1890) I was plaintiff in a case before the Interstate Commerce Commission, involving the relative rates of freight on carloads and less than carloads. The Commission, after long investigation, decided in favor of the plaintiff, but the railroads applied for a re-hearing, and no action was taken on the decision, yet the present classification increases in some instances the very differentials between carloads and less than carloads which were then decided to be excessive, and this, to my mind, is the chief objection to the new classification.

I am aware that in some cases the increase is more apparent than real, owing to the fact that low commodity rates which have existed have been abolished. . . . Notwithstanding the principle of the right of the citizen on the highway, before alluded to, I admit that it is reasonable for railroads to charge as much more on less than carload lots, as it costs them more to do that kind of business, but it is an intricate question to determine, and in case of doubt I think the benefit of the doubt should be given to the many small shippers rather than a few large ones. It surely cannot be a hardship to the railroads to raise the rate upon carloads as much as they do the rate upon less than carloads, or if, in any case, they lower the rate upon carloads, lower the less than carload rate correspondingly.

The hearing lasted two days, and among the classes of shippers represented were manufacturers of tinware, carriages, jute, paving brick and water gates. The chemical industry, the wholesale grocers, dealers in preserves and jellies and wholesale dealers in crushed oyster shells for poultry food made protests.

Overheated Steel.

The following is from a paper on steel, read before the Pacific Coast Railway Club by Mr. T. O'Leary, blacksmith in the Southern Pacific shops at Oakland, Cal.:

Some persons claim that when steel is overheated it is permanently ruined, which is not so, as steel is welded into all conceivable forms of dies for presses, etc. But if steel is forged into certain shapes for tools and then overheated, it is certainly useless for the purpose it was intended for, but the material can be restored. I will give you a trade secret for this purpose.

Take about five gallons of coal oil and dissolve in it about a thimbleful of bromide potash, then take an ordinary hand chisel and heat it in a blacksmith fire until it is overheated, so that the point or cutting edge will drop when struck on the anvil. Cool the chisel in the prepared oil, heat again to a working heat and cool off in the oil; heat a third time, and upset, and draw with hand hammer a few blows, and cool off in the oil; heat again, and forge to shape required, and file a cutting edge on it while hot; then heat, and temper in water, drawing the color required for hard castings, and cool off in the oil. Now take this chisel in the tongs, and, holding it on a cast-iron block, to test its qualities, let your helper use a 5-lb. backing hammer on it, and I will gamble the helper will be played out before the cutting edge of that chisel is destroyed. This is not a theory, it is a cold fact.

Oil prepared in this manner would be of great value for train lamps and headlights, or house and shop lamps, as the oil will not flash or ignite when a lighted wick or red-hot piece of iron comes in contact with it. I have broken an ordinary house lamp with lighted wick on the shop floor, and applied all sorts of flaming waste and paper to the pool of oil, but the oil did not flash, although the paper and waste continued to light, and when pressed below the surface of the oil the light was extinguished. Skeptics can try this receipt and be convinced. It may save a train or even a caboose from being burned, as well as restore burnt steel.

TECHNICAL.

Manufacturing and Business.

Simplex bolsters, made by the Simplex Railway Appliance Co., of Chicago, are specified on the 200 box cars for the Louisville, Evansville & St. Louis Consolidated, recently ordered from the Barney & Smith Car Co.

Charles F. Pierce, formerly of the Monarch Brake Beam Co., has been appointed in charge of the railroad department of the Powers Regulator Co., makers of the Powers temperature controlling apparatus. Mr. Pierce will have offices in New York and Chicago.

The new shops of the New York Air Compressor Co. at Arlington, N. J., commenced operation in all departments but the foundry on January 2, and the company expects to have its foundry working by February 1. The company was organized about two months ago and orders have been received sufficient to run its plant for three months. Plans have been made to double the shop equipment at once, and the plant will be operated day and night until this is done.

The International Electric Traction Co. of New York City has been incorporated in West Virginia with a capital of $3,000,000, to acquire and control patents on electric railroad devices. Among the incorporators are Geo. L. Campbell, Geo. F. Kissam of New York City. Wm. S. Condor, 41 Wall St., New York, is the Attorney.

The Chicago Pneumatic Tool Co. reports a large increase in sales with the opening of 1900, its tools going to all parts of the world for a variety of uses. Among its later tools, the Boyer Long Stroke Riveting Hammers, the company states, are found to meet the requirements on all classes of riveting, particularly on boiler work.

The firm of Littlefield & Meysenburg, with offices in Chicago and St. Louis, has been dissolved, and Mr. A. S. Littlefield has been appointed Western Selling Agent of the Lorain Steel Company with headquarters at Chicago. This company makes a specialty of girder and high tee rails, special track work, and motor trucks for electric cars.

Mr. Henry J. Kimman, Mechanical Superintendent of the Standard Pneumatic Tool Company, has recently returned from an extensive European trip after establishing shops in Chippenham, London, for building "Little Giant" pneumatic tools and appliances. New machinery costing $50,000 was installed in this shop, which is now running. The prospects are favorable for a big foreign business, and some of the largest ship yards, foundries and other works are already using many pneumatic tools, while the demand is increasing rapidly in France, Germany and Russia. In England the workmen at first opposed the introduction of these tools, but this opposition is no longer serious and is rapidly dying out.

The Universal Car Bearing Co., Old Dominion Building, Chicago, has been quite successful in introducing its adjustable journal bearings and reports good prospects for an increase of business. The following list gives an idea of the equipment for which Universal bearings were ordered within the last few weeks: Thirty passenger cars for the Northern Pacific; 39 passenger cars for the Illinois Central; 350, 100,000 lbs. capacity steel cars for the Duluth & Iron Range; 1,000 cars for the Chicago, Lake Shore & Eastern; 400 cars for the Pittsburgh, Bessemer & Lake Erie; 150 cars for the Butte, Anaconda & Pacific; 4,000 cars for the Baltimore & Ohio; 450 cars of 80,000 lbs. capacity for the Great Northern, 1,250 cars for the Southern; 2,200 cars and some recent locomotives for the Illinois Central, and five locomotives for the New York, Chicago & St. Louis.

Iron and Steel.

F. T. F. Lovejoy has resigned as Secretary and as a member of the Board of Managers of the Carnegie Steel Co. He is succeeded as Secretary by A. M. Moreland.

Work will soon be begun on the new plant of the Inland Steel Co. in Tonawanda, N. Y. The main building will be 60 x 300 ft., and will be of steel and corrugated iron. D. E. Block is Vice-President.

J. Sheldon, heretofore Assistant Superintendent of the Thomas Iron Co. at Hokendauqua, Pa., has been appointed General Superintendent of the Empire Steel & Iron Co., and is now at Catasauqua, Pa.

Reports state that the New York Central has let a contract to the Hilton Bridge Co. for 20 steel girder bridges to replace light structures.

At a meeting of the Empire Steel & Iron Co. the stockholders authorized the capital stock to be doubled, making it $10,000,000. This company was organized in March, 1899, and acquired, by purchase, furnaces at Reading, Bellefonte, Topton and Catasqua, Pa.; Greensboro, N. C.; Goshen, Va., and Oxford, N. J. Leonard Peckitt is President, W. L. Sims General Manager and Treasurer, and Glen Wright Secretary.

The Eastern Bridge & Structural Co. has been incorporated in Massachusetts, with a capital of $75,000, and will build a plant at Worcester to make bridges and structural material for buildings. Among those interested are Robert H. Hinman, James C. Stewart and A. S. Miller, Jr., of Boston.

Mr. R. H. Sayre, Jr., has resigned as Assistant General Superintendent of the Bethlehem Steel Co., and not the Pennsylvania Steel Co., as erroneously stated last week. He is succeeded by Archibald Johnston.

The wages of the men in the iron mines of the American Steel & Wire Co. at Crown Point have been advanced 10 per cent. Two and one-half per cent. will be retained by the company and deposited as a benefit fund.

A large order for rails for the Victoria RR. of Australia, reports state, has been given the Maryland Steel Co., and other orders will follow. Shipments of nearly 50,000 tons of rails have already been made to Australia. Robert Singleton of Melbourne, an officer of the Victoria RR., is in this country to inspect material before shipment.

At a meeting of the stockholders of the Alabama Steel & Wire Co., held at Birmingham, Ala., last week, James Bowron was elected a director succeeding C. E. Robinson. E. T. Schuler was elected President; G. H. Schuler, Secretary and Treasurer.

Fire in the Black Diamond Steel Works, owned by the Park Steel Co. in Lawrenceville, Pa., caused damage to the extent of $10,000.

The stockholders of the Hussey-Truxall Steel Co. on Jan. 19 voted to issue $50,000 of preferred stock. This company was incorporated early in December. (Dec. 8, p. 847.)

After Feb. 15 the Anderson Iron & Bolt Co. at Anderson, Ind., will be known as the Louisville Bolt & Iron Co., and be located at Louisville, Ky. The works at Anderson will be kept in full operation until the new plant now building at Louisville is finished.

Reports from Pittsburgh during the past week state that a plan to consolidate the large bridge building companies of the country is again under consideration.

Cylinder and Bearing Metals Lubrication.

The Master Mechanics' Association Committee on Journal Bearing, Cylinder Metals and Lubrication issues the following circular of inquiry:

In order that a report may be prepared for presentation to the Association at its next convention, the Committee on the above subject would ask for information on the following points:

1. Please give the Committee what you consider the best cylinder mixture for your heaviest high-pressure engines.
2. Do you, or do you not, get any advantage in casting cylinder saddles separate from the cylinders?
3. Do you experience any trouble by cylinder saddles breaking when cast in pairs?
4. Do you prefer solid piston heads? If so, is there any advantage in using same?
5. Do you experience any greater cylinder wear where solid heads are used, as compared with spider or bull-ring type?
6. Please give mixture of metal in piston heads and packing rings.
7. How much smaller do you allow these heads to run below the diameter of cylinder before renewing?
8. How much larger in diameter do you turn the packing rings above the diameter of the cylinders?
9. Please give the Committee the best alloy for various bearing metals on your heavy and fast high-pressure passenger engines.
10. Would you recommend a soft metal to be used in connection with bearing metals? If so, in what manner would you apply it? Please also give alloy of same.
11. Do you experience any difficulty in lubricating cylinders and valves and machinery on your high-pressure heavy and fast passenger engines? Please give the Committee the benefit of your experience on this subject.
12. What do you consider the best method of locating oil holes, oil grooves and oil pockets in driving boxes?

Replies to this circular should be addressed to W. C. Dallas, Chairman, care of Galena Oil Co., Franklin, Pa., and should be forwarded not later than April 1, 1900.

Stone Dry Docks Instead of Timber.

The House of Representatives has passed the bill authorizing the change in the material from timber to stone for the new dry docks at League Island, Pa., and at Mare Island, Cal. The total additional cost of these docks will be about $700,000.

Soundings for the New East River Bridges, New York.

Bridge Commissioner John L. Shea will receive proposals until Jan. 31 for making soundings and borings on the sites of the towers of the two proposed bridges over the East River—No. 3 between the boroughs of Manhattan and Brooklyn, and No. 4 between the boroughs of Manhattan and Queens. The proposals are to be in accordance with the plans and specifications to be seen at the office of the Department of Bridges, Manhattan Borough. Security for the performance of the contract in the amount of $7,000 will be required.

The Isthmian Canal.

"The Proposed American Isthmus Canal" was the subject of the lecture recently given by Mr. Foster Crowell in Brooklyn, before the Engineering Section of the Brooklyn Institute of Arts and Sciences. "The Canal Commission, appointed by the President," concluded Mr. Crowell, "is now on the field in person, and has a large staff at work in the effort to finally dispose of the question of relative superiority of the two routes at Nicaragua and Panama respectively, and also to dispose finally, if possible, of any lingering doubt which may remain as to the feasibility of some other route which may possibly exist. I think the present action of Congress in an endeavor to forestall the results of the commission's investigations is ill advised and liable to involve the country in misapprehension and possibly costly errors. Having paused for half a century already, it is well worth while for this country to take a year or two longer, if need be, to settle the question upon an absolutely correct and unalterable basis."

Side Tank Mogul Locomotives for South Africa.

The Dickson Mfg. Co. has just completed four side tank mogul locomotives for the Dundee-Vryheid Railway Company of South Africa. These were built in accordance with the general specifications of the railroad company and from the design of the makers of the engines. These engines are built for a gage of 3 ft. 6 in. and the weight on the driving wheels is about 62,000 lbs.; total weight about 73,000 lbs. The water tank has a capacity of 850 gals. The working steam pressure is 180 lbs., the fuel bituminous coal. They are equipped with automatic vacuum brakes and Hancock inspirators. The following are the principal dimensions: Cylinders, 14 x 20 in.; diameter of driving wheels, 44 in.; driving wheel base, 12 ft. 6 in.; total wheel base, 19 ft.; length of firebox, 72 in.; width, 30 in.; diameter of boiler, 48 in.; number of tubes, 186; length of tubes, 9 ft. 6½ in.; diameter of tubes, 1¾ in.

The Navigation Congress.

The eighth session of the International Navigation Congress convenes at Paris late in July. A movement is on foot to arrange to have the ninth session held in this country. To accomplish this the invitation must be extended by our Government during the session of the Congress in Paris. A bill has been introduced by Senator Cullom to authorize the President to invite the International Congress of Navigation to hold its ninth session in Washington. This bill carries with it an appropriation of $25,000 to meet the expenses incurred by the Government in connection with this session. Of course, it is desirable that those who are interested in bringing this about should write to their senators urging favorable action upon the bill.

Axle Lighting and Refrigerating.

On Friday of last week a party of railroad men, electrical experts and representatives of the press, left New York City for a trip to New Orleans and return for the purpose of seeing the lighting and refrigerating apparatus of the Electric Axle Light & Power Company. The party went in the Pullman car "Olivette," which is equipped for axle lighting. The refrigerating apparatus and method was to be shown on a special daylight run over the Louisville & Nashville from Montgomery to New Orleans. It was intended that the party returning should reach New York Saturday, Jan. 27.

Vitrified Culvert and Sewer Pipe.

The Blackmer & Post Pipe Company announce that they have decided to make all their vitrified pipe sections which are from 27 in. to 36 in. diameter, 3 ft. long instead of 2½ ft. as heretofore. Inasmuch as these large sizes of pipe must anyway be handled with a derrick or other mechanical appliance, there is no loss in making them longer, and time and labor will be saved in making joints, construction will be facilitated, better alignment and grade can be secured and a better job altogether by reason of the reduced number of joints.

The National Steel Co.

On Jan. 1 the National Steel Co. secured control of the blast furnaces, steel works and rolling mills of the Aetna-Standard Iron & Steel Co. at Mingo Junction and Bridgeport, O. Hereafter these mills will be operated as the Aetna-Standard Works. B. M. Caldwell, Vice-President and General Manager of the Aetna-Standard Iron & Steel Co., has resigned, and that office is abolished. John A. Topping will be General Manager of both companies.

Automatic Block Signaling.

The Chicago & Alton is preparing to put up automatic block signals along its main line from Chicago to Joliet, 37 miles.

THE SCRAP HEAP.

Notes.

The Boston & Maine has posted notices at certain passenger stations requesting passengers to enter cars by the rear and leave them by the front door.

A Pennsylvania paper says that the Allegheny Valley gives to all of its enginemen and conductors, who have served as such for 10 years, annual passes for themselves and their wives.

New York newspapers say that the conductors on the Wagner sleeping cars have had their pay reduced from $90 a month to $75. The lower rate is that which prevails throughout the lines of the Pullman Company, which now runs the Wagner cars.

The Southern Pacific has lengthened the time of its fast night express train between San Francisco and Los Angeles. This train, which was put on a year or two ago, has been scheduled at 47.5 miles an hour, but this rate will now be reduced to 40 miles an hour.

The Baltimore & Ohio has revised the wages of certain freight trainmen so as to make the rates uniform throughout the territory of the company both east and west of the Ohio River. In some cases rates have been increased, but in no case have they been decreased. At the same time the pay of firemen who fire on the largest freight engines has been made higher than that of men on smaller engines; but aside from this there has been no general increase of pay.

The following, from an Ohio paper, appears to be the correct version of the report concerning the increase of pay for certain enginemen on the Lake Shore & Michigan Southern: "Heretofore, when a fireman was promoted to engineer he was obliged to run 40,000 miles at $3 per 100 miles on passenger and $3.15 per 100 miles on freight, taking a year or more. Then he was advanced to the first class at $3.50 and $3.80. Now the new engineer is to get first grade pay from the start. The premium which was paid monthly on each division for the most economically run engine during the month is discontinued. The engineer and fireman used to divide this premium, which sometimes was as high as $22 a month."

England as well as America is now enjoying unusual business activity, and on the English railroads, as well as our own, there is loud and constant complaint of scarcity of freight cars, particularly among furnace men and other parties using coal. It is reported that in some districts the coal shippers have "increased the charge to merchants" for the use of their freight cars by 3d. a ton for all distances. As is well known, the greater portion of the mineral traffic of Great Britain is carried in cars owned by the miners or by other non-railroad interests. The fact that the charge is made against the merchants would seem to indicate not only that demurrage is pretty generally collected from consignees, but that the whole of the cost of the car while standing at destination is made a separate charge, distinct from the transportation bill.

A New Use for Flexible Shafting.

Some weeks ago the Stow Flexible Shaft Co. had a request from one of the largest fruit growers of Southern California for an equipment of flexible shafting so arranged as to attach to a motive power for tree trimming. Mr. Frederick Schoff, proprietor of this company, at once set about arranging such equipment, and reports success.

An Elevated Interurban Road.

Press dispatches from Milwaukee report that several Milwaukee business men have agreed to pay for building one mile of an elevated electric railroad between Milwaukee and Chicago on plans covered by patents of L. F. Cook, of Chicago, who claims a speed of from 60 to 100 miles an hour. It is said that contracts for the experimental mile will be let soon.

The New York & Brooklyn Bridge for Paris.

The John A. Roebling's Sons Co., of Trenton, have shipped to the Paris Exposition a model of the Brooklyn Bridge. The model shows the trolley tracks and cars, as well as the bridge proper. The bridge, with the approaches, is 28 ft.

An Interstate Commerce Commission Decision.

The Interstate Commerce Commission, in an opinion by Commissioner Clements, has announced its decision of the case of the Savannah Freight Bureau against the Louisville & Nashville and others. It is held that the rate on cotton from Chipley and other stations in Florida on the Louisville & Nashville to Savannah should not be more than 25 cents higher than from the same stations to New Orleans.

The Commission rules that a carrier cannot lawfully establish and maintain an adjustment of rates which in practice prevents shippers on its line from availing themselves of a principal market, which they have long been using, and confers a substantial monopoly upon a new market in which, for reasons of its own, it has greater interest. Another ruling is that when a carrier makes rates to two competing markets which give the one a practical monopoly over the other because it can secure reshipments from the favored locality and none from the other, it goes beyond serving its fair interest, and disregards the statutory requirement of relative equality as between persons, localities and particular descriptions of traffic.

After laying down these principles, the Commission finds that the Louisville & Nashville makes certain local rates on rosin and turpentine from stations on its Pensacola & Atlantic division in Florida to Pensacola, Fla., and that it joins with connecting carriers in making certain through rates from the same stations to Savannah, Ga. For its service to the junction point the Louisville & Nashville exacts shares of the through joint rates to Savannah which greatly exceed its purely local rates for like distances to Pensacola, while the shares accepted by its connecting carriers are reasonably low. The Commission decides that the shares of the Louisville & Nashville in the through rates to Savannah are unreasonable and unjust and operate to make the entire through rates unlawful.

The decision requires the Louisville & Nashville to cease and desist from exacting shares of the through rate to Savannah which are in excess of its local rates to Pensacola for like distances, but on turpentine from some of the more easterly stations

it may have more than its local rate for the like distances to Pensacola, and as to such shipments a differential is found proper. This remedy, which is based upon the relation of rates to the two competing markets, will enable the Louisville & Nashville to increase the rates to Pensacola or, in conjunction with its connections, reduce the rates to Savannah, or to use both means in conforming to the adjustment required by the facts in the case.

Grade Crossings at Schenectady.

The New York Central & Hudson River is preparing plans for extensive alterations at Schenectady, N. Y., involving the separation of grades at a number of street crossings and improvements at the station, the total probable expenditure being about $800,000.

The Talienwan-Newchwang Railroad.

The China Gazette of December 11 says: We are informed that the railroad connecting Newchwang, Port Arthur and Talienwan was finished last week and the trains are now running the full distance of 200 English miles. The most difficult section was between Port Arthur and Talienwan. The Russians have displayed both energy and speed, the time occupied in construction being under two years. The line from Newchwang to Moukden is now working.

Concession for a Road in Chile.

Senor Valentin Lamber, 14-137 Calle Cerro, Santiago, has received a concession from the Government of Chile for a railroad between Peumo and a place called Las Cabras. It will connect with the Pelequen & Peumo line.

Mr. Callaway on Differentials and Export Grain.

President S. R. Callaway of the New York Central, in talking yesterday of trunk line policy and differentials, said:

"The attitude of the New York Central and its allied lines has naturally always been favorable to the protection and building up of the port of New York, as against the influences which have been at work to foster other Atlantic seaports. Differentials were only agreed to at first because they were forced by such competition, which it was thought might be checked to some extent by such means. The Vanderbilt lines have always claimed that the differentials were too high, and as a consequence of this, in a great measure, they have been constantly reduced. The differential on ex-lake grain was done away with last year, and in other cases cut in two.

"It is a mistake to think that the granting of a small differential to ports less favored naturally than New York is going to ruin or even seriously effect New York's pre-eminence as an Atlantic seaport. The natural terminus on this side of the Atlantic for any sound and well-established line of vessels is the harbor of New York, and it is generally conceded that something more than a differential of a few cents this way or that is required to attract such lines to less favored ports. The trouble has not been so much with the differential as in the fact that all sorts of schemes have been put into effect, some of the roads terminating at other points even having gone so far as to practically subsidize steamship lines.

"Notwithstanding the differentials and other so-called disadvantages under which New York is said to labor, the fact remains, and is shown by the statistics, that the port of New York gets a very large share of the business. In 1899, for instance, the railroads carried to New York over 36 per cent. of all the grain of the country that came to Atlantic tidewater, while the canal carried over 4 per cent., making a total of 40 per cent., and leaving but 60 per cent. of the entire business to be divided among the seven other Atlantic ports of export."—New York Times.

Sobu Railway in Japan.

The Sobu Railway Co. has increased its capital stock by 1,200,000 yen ($600,000) for the purpose of duplicating its line between Honji and Iakura, 32½ miles. The gage is 3 ft. 6 in. The office of the Chief Engineer is at Tokio.

A New Railroad Extension in Brazil.

The Great Western RR. of Brazil has signed a contract to build a branch line of meter gage in the State of Parahyba from Pilar to Timbauba, 25 miles, to connect with the Conde d'Eu Line. Follet Holt of Pernambuco, Brazil, is General Manager and Resident Engineer. F. Parrish of 5 Gloucester Square, London, is Chairman.

Automatic Block Signals on the Fort Wayne.

The Pittsburgh Dispatch publishes an interesting note concerning the electric signals now being put up along the line of the Pittsburgh, Ft. Wayne & Chicago, between Allegheny City and Rochester, Pa., 24 miles. There are four tracks on this portion of the road and automatic track circuit block signals are being erected for all of them. There are 194 signals and the blocks vary in length from one-half mile to about one mile, the shorter blocks being those nearest the terminus (Allegheny). These signals are arranged on the plan described by Mr. Rhea in his paper published in the Railroad Gazette of Nov. 24. At the entrance of each block there is a semaphore with a single arm, which can be shown in three different positions. The horizontal position or a red light will indicate stop; an inclined position or a green light will indicate that the block is clear but that the next succeeding signal will indicate stop; while the arm in a vertical position, parallel to the post, or a white light, will indicate that the block is clear and also that the next succeeding block will be found clear. The movements of the signal will be controlled by track circuits on the same general principle as that employed in the electro-pneumatic block signals on the Pennsylvania Railroad, but electric power will be used, instead of compressed air, for pulling down the semaphore arms. It is said that storage batteries fixed at each signal bridge will be charged by a dynamo at Conway.

A New Railroad in the West Indies.

The Aruba Gold Concession Co., Ltd., is building a railroad in the Island of Aruba, West Indies, in connection with its gold, silver and copper mines and smelters there. Wm. P. Garland of The Rowans, Colyton Road (Forest Hill Road), London, E. C., is President.

Supreme Court on South Dakota Rates.

The Supreme Court of the United States has reversed the decision of the Circuit Court in the suit of the Chicago, Milwaukee & St. Paul against the Railroad Commissioners of South Dakota. The suit was to restrain the Commissioners from enforcing reduced freight rates, and the Lower Court decided in favor of the railroad, but the case is now remanded, with instructions to make further investigation of the earnings of the road in South Dakota. The opinion, written by Justice Brewer, criticises the summary way in which the Lower Court disposed of the case.

Baltimore & Ohio Improvements in Washington.

Senator McMillan, chairman of the District Committee, introduced in the Senate, Jan. 11, a bill for extensive changes in the terminals of the Baltimore & Ohio railroad in Washington. There is a provision in the bill for the acquirement by the railroad of additional land between North Capitol St. and First St., N. E., and from C St. to Massachusetts Ave. for terminals. The bill also provides for a masonry viaduct from H St. to Florida Ave., on Delaware Ave., wide enough to accommodate five tracks. The Metropolitan Branch will be abandoned from the Y at H St. to some point north of New York Ave., where the new line on Delaware Ave. will join the Metropolitan Branch.

The B. & O. is also authorized to build outside of the city limits and south of T St., yard tracks, switches, roundhouses, shops, and other structures, and also to build beyond the city limits a branch track or "Y" for a connection between the Metropolitan Branch and the Washington Branch, without entering the city.

The entire work is to be done under the direction of the District Commisioners and be finished in five years. The cost of the improvements will be divided between the District of Columbia and the railroad. Several bridges will be built and some streets will necessarily be closed.

Manhattan Elevated Railroad Extension.

The Manhattan Ry. Co., New York, has notified the State Railroad Commissioners of its intention to build the extension from 177th St., the present northern terminus of the East side lines of the company, northerly to Bedford Park, as recommended by the Board. The extension will be about one mile and a half long.

Underground Railroads for Berlin.

According to a Berlin newspaper, the Province of Brandensburg, Germany, will issue about $2,800,000 bonds to build subsidiary railroads. Berlin is to build a system of underground railroads. Full particulars can be had from the Minister of Public Works, 79 Wilhelmstrasse, Berlin, Germany.

Steel Making in India.

Major R. H. Mahon, Superintendent of Ordnance Factories at Cassipore, India, has recently reported to the Under Secretary of State for India on the practicability of making iron and steel in India. The sum of his report seems to be that with the cheap labor of India it would be possible now to make iron and steel there in competition with the rest of the world. Large deposits of ore are found in Madras and Bengal, the country furnishes coal, and limestone can be cheaply got from Burmah. To succeed, however, the plant should be capable of a large output, and it is recommended that it be established near Calcutta.

Korea's First Railroad.

A partial opening of the first railroad in Korea was recently made. It is projected to run from the city of Seoul to Chemulpo. The completed section runs from Chemulpo to a point about two miles from the river Hau. The bridge across the river is still unfinished. From the river to Seoul an electric line is now running. The road was begun under American engineers and is being completed by the Japanese. Locating surveys were made in the latter part of 1896.

Chicago Still Leads.

The newspapers say that buffet cars are to be placed on both the surface and elevated street railroads of Chicago. Designs for the cars show hinged tables, about 10 to a car, so planned that they can be turned against the wall when not in use. Four seats will be placed at each table, and one waiter, it is estimated, can attend to all the patrons of a single car. The next step contemplated is reclining chairs to relieve the journey from the prairie wards to the City Hall. When the magnificent distances which Chicago had developed first became a factor in the life of the city—when a policeman, bringing in a prisoner whom he had arrested in the 198th Ward had to camp out over night on the prairie for lack of night cars—the people were still deficient in civic pride, and some were inclined to tell that policeman that he was himself to blame for catching the man; but now they have learned from personal experience that traveling with nothing to drink gets tiresome toward the end of the day, and they will no doubt make the street buffet cars a great success.

The Gas Engine.

A daily newspaper has lately printed what purports to be an interview with Mr. George Westinghouse on the future of the gas engine. A few extracts follows:

"The advantages of the use of gas engines can best be appreciated when it is understood that if a gas company were to supplant the present gas illumination by an equal amount of electric light obtained from gas-driven dynamos it would have left for sale for other purposes over 60 per cent. of its present output. In cities where the disposal of garbage is a problem, this garbage can be used with coal to develop gas for use in electric stations. The gas engine already rivals the steam engine in smoothness of working and regulation. Gas engines are economically operated with illuminating gas and experiments that have been long and carefully conducted justify the belief that within a short time gas will be commercially produced and sold at a cost far below the lowest price that now prevails. Gas companies, then, they think, will find their profit in supplying gas as fuel. Gas engines will drive electric generators for lighting currents, for supplying power to manufacturers, street, elevated, suburban and interurban railroads. Light, heat and power will be so much cheaper than they are now that industrial conditions will be greatly changed for the better, and with them social conditions.

Boston Ship Channel.

There are indications that early in the summer work will be begun on the 2,000-ft. Broad Sound channel in Boston harbor, which the United States is to dredge to a depth of 35 ft. A few days ago bids were opened for this work, but the lowest bidder stipulated that he should not begin work until May 1, 1901. The reason for this was that the same contractor had the contract for dredging the main ship channel. There have been conferences between the United States engineers, the harbor and land commissioners, representatives of the Chamber of Commerce and other interests, and as a result it is believed the work will be started at an early date.

Pig Iron Production in 1899.

The American Iron and Steel Association has compiled statistics of the production of pig iron in the United States in 1899; also statistics of the stocks of pig iron which were on hand and for sale on December 31, 1899. Twenty-one States made pig iron in 1899, against 19 in 1897 and 1898, Minnesota and North Carolina again entering the list.

The total production of pig iron in 1899 was 13,620,703 gross tons, against 11,773,934 tons in 1898, an increase of 1,846,769 tons.

The production of Bessemer pig iron was 8,202,778 tons, against 7,337,384 tons in 1898. Basic pig iron, 985,033 tons, against 785,444 tons in 1898. Spigeleisen and ferromanganese, 219,768 tons, against 213,769 tons in 1898. Charcoal pig iron, 284,766 tons, against 296,750 tons in 1898.

The stocks of pig iron which were unsold in the hands of manufacturers or their agents December 31, 1899, amounted to 63,429 tons, against 291,233 tons on December 31, 1898. The whole number of furnaces in blast on December 31, 1899, was 289, against 240 on June 30, 1899, and 202 on December 31, 1898.

Milwaukee Street Railroad Franchise.

Last week the Superior Court at Milwaukee decided that the Mayor, City Clerk and 25 aldermen who voted for the extension franchise against the injunction of the court, as noted in our issue of Jan. 12, p. 25, are in contempt of court and cited these men to appear before the court. The court also decided that the ordinance was illegally and irregularly passed and is therefore null and void. Against this decision the Mayor and street railroad companies have appealed to the Supreme Court of the State, which has granted a writ of prohibition restraining the local court from going any further in the contempt proceedings against the city and street railroad companies.

Chicago Public Works.

Commissioner of Public Works McGann has sent to Comptroller Kerfoot an estimate of the amount of money needed by the Department of Public Works, the estimate to be used in preparing the annual appropriation bill. These estimates cover the actual conservative requirements of the department and aggregate $12,838,048, about one-half of which must be charged to the water fund. Among the items asked for is one for construction of bridges and viaducts of $3,110,000. This item is based on estimates for the removal of bridges that are absolutely necessary. Five bridges are now out of service and many more may be taken out of service in the near future. In this connection Mayor Harrison has been quoted as saying that every department must be cut to make way for new bridges and that by the strictest economy it may be possible to build six bridges this year.

Traffic Notes.

P. S. Eustis of the Burlington has been elected Chairman of the Executive Committee of the Western Passenger Association in place of Mr. Charlton.

Greater or less scarcity of bituminous coal is reported at many places throughout the country, and at Montreal it is said that the Grand Trunk and the Canadian Pacific have difficulty in keeping their engines supplied. At Philadelphia vessels have to wait many days and sometimes weeks to get cargoes for New England, owing to the scarcity of cars for bringing the coal to Philadelphia from the mines. The rate by water from Philadelphia to New England ports is now from $1.60 to $2 a ton.

Items gathered by the daily newspapers indicate that the orders which have recently been issued by the principal railroads, both east and west of Chicago, to abolish the payment of commissions on tickets are more positive than anything that has been done for years. From Chicago it is reported that even the ticket brokers admit that they expect to be obliged to go out of business at the end of this month. They say that 95 per cent. of their business comes not from legitimate brokerage but from sales made directly for railroads. They say that if the present orders had originated with the general passenger agents there would be no ground for alarm, but that when the highest authority in each company takes action they conclude that the order "means business."

The Railroad Commission of Texas is again at work on the oat tariff. The Gulf, Colorado & Santa Fe, the Missouri, Kansas & Texas, the Sherman, Shreveport & Southern, and the Fort Worth & Rio Grande made an advance on rates from points on their respective lines to points outside the State. Texas shippers complained on the plea that they were prevented from doing business in other states, and the Commission sided with them. Following conferences, it was announced that the matter had been compromised to the satisfaction of all concerned. It appears, however, that the railroads are still charging the obnoxious rates, and the Commission has, therefore, ordered an emergency maximum rate of 8 cents as before, on carload shipments between all points on the roads mentioned.

Lake Notes.

The new steel steamer John W. Gates, built for the American Steamship Co., was launched at the Lorain yards of the American Shipbuilding Co. on Jan. 20. The new boat is the first 500-ft. steamer built on the lakes and is 52 ft. beam and 30 ft. molded depth. Another steamer of the same dimensions to be named the J. J. Hill will be launched in about six weeks.

LOCOMOTIVE BUILDING.

The South Shore, of Canada, wants two locomotives.

The Bangor & Portland will probably order one locomotive.

The Gulf & Ship Island expects to order two more locomotives.

The Columbia Southern is figuring on buying one new locomotive.

The Detroit & Mackinac is in the market for two 10-wheel locomotives.

The Pittsburg & Western (Baltimore & Ohio) will order six locomotives.

The Texas Midland expects to order five engines within the next six months.

The Mobile & Ohio has ordered 14 locomotives from the Rogers Locomotive Co.

The Gila Valley, Globe & Northern expects to buy, between now and July 1, two locomotives.

The Gulf, Beaumont & Kansas City expects to order three locomotives within the next six months.

The Crystal River will want five locomotives. Some of these will be used on the Colorado & Wyoming, now building.

The Southern Pacific order with the Schenectady Locomotive Works calls for four switching and six consolidation engines.

The Quebec Central directors have authorized the buying of two new locomotives, but it is doubtful if the order will be placed at present prices.

The Iowa Central has prepared specifications for from five to 15 new locomotives. It has not been decided how many will be ordered, but the number is placed at eight or ten.

The Virginia & Southwestern engines ordered from the Baldwin Locomotive Works, and referred to Jan. 12, will be of the Vauclain compound type with 15½ in. and 26 in. x 28 in. cylinders, 50 in. driving wheels and a tender capacity for 4,500 gals. of water. The engines will weigh in working order about 163,000 lbs. with 145,000 lbs. on the driving wheels.

The Baldwin Locomotive Works have received an order to build 30 10-wheel passenger engines for the Paris & Orleans, of France. They will have 19 in. x 26 in. cylinders and 69-in. driving wheels and will weigh in working order about 136,000 lbs., with about 95,000 lbs. on the driving wheels. The tenders will be six-wheeled, with a capacity for 4,500 gals. of water. The engines will be fitted with Westinghouse brakes and the entire order is to be shipped by August 1.

The one heavy compound locomotive ordered by the Minneapolis, St. Paul & Sault Ste. Marie from the Baldwin Locomotive Works and noted in our issue of Jan. 12, is for July 1, 1900, delivery. It will have cylinders 17 in. and 27 in. x 34 in.; drivers 55 in. in diam., and will weigh 210,000 lbs., of which 190,000 will be on the drivers. The boiler will be of the extended wagon top type with radial stays, and a working steam pressure of 215 lbs. The tubes will be of charcoal iron, 2 in. in diam.; the firebox will be 121 in. long and 42½ in. wide. The tank capacity for water will be 6,000 gals. and the coal capacity nine tons. The special equipment will include Westinghouse air brakes, Gollmar bell ringers; Taylor iron axles, stay bolts and crank pins; Washburn couplers; Ohio and Sellers injectors; Jerome piston and valve rod packings; Leach sanding device; Michigan and Detroit lubricators; Utica steam gages; Standard tires; cast steel wheel centers and Westinghouse draft gear. The number and length of the tubes, material for firebox and make of springs and safety valves had not been determined at last accounts.

CAR BUILDING.

The Columbia Southern is in the market for 50 box and 10 flat cars.

The Gulf & Ship Island is figuring on buying from 100 to 200 flat cars.

The Bay of Quinte will probably build at its own works 10 or 15 flat cars.

The United Verde & Pacific contemplates ordering 10 additional coal cars.

The Gila Valley, Globe & Northern expects to order two passenger coaches and two cabooses.

The South Shore, of Canada, expects to be in the market before long for about 50 box cars.

The Maine Central will likely order some new rolling stock, but nothing definite has been decided.

The Mobile & Ohio on Jan. 24 decided to order 500 freight cars from the American Car & Foundry Co.

The Duluth, Missabe & Northern has ordered 10 caboose cars from the American Car & Foundry Co.

The statement of a contemporary that the Boston & Maine had ordered 300 freight cars is officially denied.

The Colorado & Southern is reported to have ordered 250 coal cars from the American Car & Foundry Co.

The Mobile, Jackson & Kansas City has ordered 15 box and 50 flat cars from the American Car & Foundry Co.

The Monterey & Mexican Gulf is reported to have ordered 100 box cars from the American Car & Foundry Co.

The Gulf, Beaumont & Kansas City needs 1,000 additional cars, but it is not certain when the order will be given.

The Lake Shore & Michigan Southern is reported in the market for freight cars. We have no authentic information.

The Pecos Valley & Northeastern expects to order 300 stock cars, but it is not decided when the contract will be given.

The Bangor & Portland contemplates buying at least 25 gondola cars and one new combination baggage and mail car.

The Crystal River wants 50 freight and two passenger cars, some of which will be used on the new Colorado & Wyoming.

The Kansas City, Pittsburgh & Gulf is reported in the market for 10 or 15 passenger cars. We have no official information.

We are informed, unofficially, that the Hocking Valley will order 1,000 more coal cars of 80,000 lbs. capacity for early fall delivery.

The New York, Ontario & Western has ordered one reclining chair and five drawing room cars from the American Car & Foundry Co.

The Solvay Process Co., of Syracuse, N. Y., has ordered 10 cars from the American Car & Foundry Co. They will be built at the Milton works.

The General Electric Co. has ordered four flat cars of 100,000 lbs. capacity from the American Car & Foundry Co. They will be of special design.

The Texas Midland will probably order, within the next six months. two baggage, four passenger, two chair, 100 box, and 50 coal cars and three cabooses.

The report that the Southern is in the market for coke cars is incorrect, the order having already been given to the American Car & Foundry Co., as stated Jan. 5.

The Quebec Central is figuring on buying seven or eight passenger cars and about 150 box and a few flat cars, but it is doubtful if orders will be given at present prices.

The New York, New Haven & Hartford order for 100 coal cars with Osgood Bradley & Sons was placed some time ago the work of building having only just been started.

The Atchison, Topeka & Santa Fe will, it is stated, build 10 chair and 200 furniture cars at its Topeka shops. The chair cars are to have wide vestibules and be lighted with electricity.

The Southwestern Coal & Improvement Co. (substantially identical with the Missouri, Kansas & Texas) has ordered two chair cars, two coaches and two cabooses from the American Car & Foundry Co.

The 100 box cars ordered Dec. 26 by the St. Louis & San Francisco from the American Car & Foundry Co. are for April delivery. They will be of 60,000 lbs. capacity, 34 ft. long and equipped with iron axles, American Steel Foundry Co.'s bolsters and trucks, New York air brakes, Trojan couplers, Scott springs and American Car & Foundry 33-in. double plate wheels.

The Mexican International has ordered 100 flat cars of 60,000 lbs. capacity, one combined first and second-class passenger car, one third-class passenger car and one baggage, mail and express car from the Barney & Smith Car Co. In our issue of Jan. 12 we noted an order of the road with the same car building company for 100 box cars of 60,000 lbs. capacity and last week mentioned an order for 100 plain bottom gondola cars of 60,000 lbs. capacity with the American Car & Foundry Co.

The Louisville, Evansville & St. Louis Consolidated order for 200 box cars with the Barney & Smith Car Co., referred to Jan. 12, was signed Jan. 16 and calls for cars of 60,000 lbs. capacity, to weigh about 31,000 lbs. and to measure 36 ft. long and 8 ft. 4 in. wide inside, and 7 ft. 6 in. high from top of floor to top of plate. The special equipment will include Simplex bolsters, Westinghouse brakes, Fulton brasses, S., H. & H. couplers, Miner draft rigging, cast iron journal boxes, Murphy Improved roofs, Scott springs, diamond trucks and B. & S. 33 in. cast iron wheels.

BRIDGE BUILDING.

ADELINE, ILL.—Bids are wanted on the 30th by John H. Eakla for an iron bridge over Leaf River for Maryland Township.

ALMONTE, ONT.—Ramsay Township Council has appointed a committee to arrange for a new bridge at Glen Isle.

BALTIMORE, MD.—The Baltimore & Ohio has offered to build a bridge across the tracks in the neighborhood of Ridgeley and Ostend sts.

The County Commissioners of Baltimore and Carroll counties are considering the advisability of build-a bridge over the Patapsco River on the Deer Park road.

A new bridge will be built in place of the present Snuff Mill bridge. Albert Weber, Superintendent of Bridges.

BLOOMINGTON, IND.—The Columbus, Bloomington & Terre Haute RR. will need three iron bridges. Edwin S. Brodix, President.

BOSTON, MASS.—A resolution was recently introduced in the Board of Aldermen to have a bridge built over the New York, New Haven & Hartford RR. at Rossiter St. and Bowdoin Ave.

BUFFALO, N. Y.—The Delaware, Lackawanna & Western has submitted plans to the Council for a bridge to replace the old North Main St. structure which has been ordered removed.

CALDWELL, N. J.—The Erie RR. will be requested to build the proposed bridge in Bloomfield Ave., at the intersection of the trolley railroad crossing.

CHARLES CITY, IA.—Reports state that a bridge is contemplated over the Cedar River at Leland Ave.

CHICAGO, ILL.—Bids are wanted Feb. 21 by the trustees of the Sanitary District, 1110 Security Bldg., Chicago, for a bridge over the Chicago River at Canal St. Joseph F. Haas, Clerk of the Board.

CINCINNATI, O.—A committee of the Board of City Affairs are considering a site for a proposed bridge over Mill Creek on Spring Grove Ave.

CLEVELAND, O.—The city of Cleveland on Jan. 15 sold $100,000 of 4 per cent. 14-year bridge bonds.

COSHOCTON, O.—The bridge proposed across the Muskingum River at West Main St., we are told, will be about 900 ft. long, with approaches, and cost about $50,000. Thomas McConnell, Commissioner.

DAYTON, O.—A bill has been favorably reported in the Ohio House authorizing a $27,000 bridge over the Miami River at Dayton.

DENISON, TEX.—The bids received Jan. 6 for a viaduct have been rejected by the City Council.

DES MOINES, IA.—Bids are wanted by Feb. 14 for the highway bridge across the Des Moines River at North Sixth Ave.; also for the abutments for the bridge which is to be built over the Dest Moines at East Sixth St., according to report. (Dec. 22, 1899, p. 885.)

DULUTH, MINN.—Plans for a proposed suspended bridge over the channel at Duluth are shown on another page of this issue.

EAST HAVEN, CONN.—The plans for the drawbridge across the river between East Haven and Branford are waiting for the approval of the Secretary of War.

EMPORIUM, PA.—The County Commissioners are receiving bids for an iron bridge over Portage Creek near this place. C. J. Goodnough may be addressed.

HAMPTON, N. H.—The bridge which is proposed over the Hampton River between Seabrook and this place will probably be an iron tubular pile bridge, 3,400 ft. long and cost about $25,000. The Commission appointed by the Governor will probably receive bids in the spring of 1901. Arthur M. Dudley, member of the Committee and Engineer, Exeter, N. H.

HARRISBURG, PA.—It is reported that the Pennsylvania will soon replace the Maclay St. bridge with a new structure. Some work was done on this bridge a few years ago. It will be 280 ft. long and 40 ft. wide.

A large steel, concrete and brick bridge will be built over Market Square, for which plans are now being drawn in the office of the City Engineer.

HOUSTON, TEX.—The Council has been petitioned to have the Houston, East & West-Texas Ry. build a bridge across Campbell St.

KANE, PA.—Bids are wanted until Feb. 22 by the Burgess and Council for the steel span bridge of 205 ft., which is to cross the Pittsburgh & Erie RR. (Nov. 3, 1899, p. 767.)

KANKAKEE, ILL.—We are told that it is not definitely decided whether the new bridge to cross the Kankakee River at Washington Ave. will be of concrete or steel. The old bridge has been closed. E. B. Warriner, City Clerk.

KING WILLIAM, VA.—A bill has been introduced in the Virginia Legislature to empower the Supervisors of King William County to build a bridge over the Pamunkey River.

LOCKPORT, N. Y.—The State will be asked to make an appropriation for the bridge proposed over the canal at Pine St.

LOURENCO MARQUEZ, SOUTH AFRICA.—Tenders for an iron port bridge 833 ft. (260 meters) long and 65½ ft. (20 meters) wide, to be built in the port of Lourenço Marquez, Delagoa Bay, Africa, are to be deposited with the general office of the colonies, at Lisbon, Portugal, by March 23, 1900, 4 p. m. The time allowed for building eighteen months; security to be deposited—provisionel, 20,000 milreis; definite, 5 per cent. of sum for which contract is awarded.

MIDDLETOWN, N. Y.—The State Railroad Commissioners have authorized the removal of the grade crossings on Genung St., and bridges will be required for the New York, Susquehanna & Western and for the Erie railroads.

NEBRASKA CITY, NEB.—Bids are wanted Feb. 8 by the Commissioners of Otoe County for building all bridges that may be ordered by the Board of Commissioners during the year beginning March 4, 1900. The steel bridges are to be 80 to 85 ft. long, five panel. H. R. Young, County Clerk.

NEW BEDFORD, MASS.—The City Council recently passed a resolution to have the grade crossings of the Old Colony RR. on the highway leading to the Fairhaven bridge abolished.

NEW BLOOMFIELD, PA.—The Grand Jury has approved the report of the viewers for a county bridge over Big Buffalo Creek at Weaver's Mill, Saville Township.

The report of viewers on the county bridge at Center was also accepted.

NEW HAVEN, CONN.—We are told that the $325,000 of bridge bonds to be sold by the city of New Haven will probably not be issued for four months. Jonathan N. Rowe, Comptroller.

NORWAY, MICH.—A bridge is proposed across the Menominee River by the Dickinson County Board of Supervisors.

OMAHA, NEB.—The Commissioners of Douglas County are considering a site for the proposed new bridge over the Elkhorn River which will probably cost about $10,000.

PAVILION CENTER, N. Y.—The State Railroad Commissioners have granted the petition of the Buffalo, Rochester & Pittsburgh for the abolishment of a grade crossing in this town. (Nov. 10, 1899, p. 785.)

QUINCY, CAL.—The Board of Supervisors are considering the petition for a bridge across Jamison Creek.

RED BLUFF, CAL.—At a meeting of the Board of Supervisors on the sixth, the clerk was instructed to advertise for proposals for a bridge on Hatch Road.

ROCHESTER, N. Y.—Reports state that the West Ave. bridge over the Erie Canal will be built during the close of canal navigation next season. It is to cost about $75,000. (Feb. 3, 1899, p. 91.)

ROME, N. Y.—The city of Rome has approved of a bill for the steel bridge proposed over the Black River Canal at East Dominick St. An appropriation of $14,000 will be asked from the State. J. H. Carroll, City Chamberlain.

SALAMANCA, N. Y.—The Erie RR. proposes to build an underground crossing in connection with plans for a new depot.

SCHENECTADY, N. Y.—The grade crossings which the New York Central & Hudson River RR. proposes to abolish at this place in connection with building a new railroad will cost about $800,000.

SYDNEY, N. S. W.—C. W. Dailey, Engineer-in-Chief of the Sydney Harbor Works, will receive competitive plans for a bridge over Sydney Harbor until Aug. 1. This bridge will cost about $2,500,000 and a prize of $5,000 will be given for the best design. Geo. W. Bell is the United States Consul at Sydney.

SYRACUSE, N. Y.—An appropriation will be asked of the State for a hoist bridge over the Erie Canal as an extension of Hiawatha Ave. The road will pass under the tracks of the New York Central and will probably need a bridge at that point.

TORONTO, ONT.—The Hamilton Bridge Works of Hamilton, Ont., has the contract for the iron bridge to be built over the River Don on the line of Queen St., Toronto. It will be 137 ft. long, of 42 ft. roadway and have two 10-ft. sidewalks. It will be a through bridge of the Warren low truss design. The entire work is to cost $36,000. Wm. Gibson of Toronto is building the foundations.

TROY, N. Y.—Plans are now being considered by the New York Central & Hudson River RR. for the elimination of some of the grade crossings in Troy in connection with the plan to build a new station.

VINCENNES, IND.—The Commissioners of Knox County will receive bids Feb. 7 for supplying and placing steel joists, and for supplying and building steel highway bridges with stone abutments, the total cost of which is about $12,000. J. S. Spiker, Engineer in charge.

WARWICK, N. Y.—The State Railroad Commissioners have granted the petition of the Lehigh & Hudson River RR. Co. to have the grade crossing 520 ft. east of the stone bridge station on Bellvale Road abolished. An overhead bridge for the highway is suggested.

WESTFIELD, MASS.—A hearing will soon be had before a special committee on the abolition of grade crossings on the Lower Pochassic Road.

WORCESTER, MASS.—A bill has been introduced in the Legislature to abolish the grade crossings in Worcester for which plans have been under consideration for several years.

YOUNGSTOWN, O.—We are told that a bridge has been petitioned for across Mill Creek at Mahoning Ave. Marcus Westerman, County Commissioner.

ZANESVILLE, O.—Reports state that the old Y bridge at the junction of the Muskingum and Licking rivers in Zanesville has been condemned and closed to traffic.

Other Structures.

BIRMINGHAM, ALA.—The Republic Iron & Steel Co. will build a new blast furnace near Birmingham. S. V. Huber & Co., Pittsburgh, Pa., are the Consulting Engineers.

CAMBRIA, PA.—The Cambria Steel Co. intends to build a large brick and steel addition to the plant to increase the capacity. Plans are being prepared. It is said bids will be wanted in a month or so.

DUBUQUE, IA.—The Chicago, Milwaukee & St. Paul is preparing plans to rebuild its shops at Dubuque which were destroyed by fire in December. About $100,000 will be used for this purpose. The new shops will be larger than those destroyed.

ELIZABETHTON, TENN.—The Virginia & Southwestern Ry., reports state, has begun work on a new station at this place.

MONTREAL, QUE.—The contract for building the large grain elevator which the Connors Syndicate will put up at Montreal, is said to have been let to Barnett & Record of Chicago, Ill.

NEW YORK, N. Y.—Senator Ahearn last week introduced a bill in the Senate which provides for the improvement, including new docks, of the water front of New York City by the Department of Docks at an expenditure of about $12,000,000.

OTTAWA, ONT.—The Canada Atlantic Ry. will build a large grain elevator at Depot Harbor at a cost of between $250,00 and $300,000. The company is having built at Toronto a steamer of large capacity for use in its grain traffic on the Great Lakes, and it is reported preparations are being made to add further to the fleet.

RALEIGH, N. C.—The Seaboard Air Line will at an early date rebuild the shops destroyed by fire some years ago.

SALAMANCA, N. Y.—See Bridge Building.

SCHENECTADY, N. Y.—We are told that nothing definite has been decided in regard to building a new freight house at this place by the N. Y. C. & H. R.

SOUTH AMHERST, MASS.—The Boston & Maine is reported to have let a contract for a new station at South Amherst to replace the one burned some time ago.

TROY, N. Y.—See Bridge Building.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xii.)

Indiana Engineering Society.

The Indiana Engineering Society will hold its annual meeting at Purdue University, Lafayette, Ind., on February 1, 2 and 3. The membership of this organization is made up chiefly of city engineers and county surveyors.

Pacific Coast Railway Club.

At the meeting of the Pacific Coast Railway Club on Dec. 16, Mr. C. C. Bonte, of Sacramento, presented a paper on the "Methods of Accounting for Coal Used on Locomotives." Nine new members were added an dthree applications for membership were placed on record.

American Institute of Electrical Engineers.

The 139th meeting of the Institute was held at 12 West 31st Street, New York City, Wednesday, Jan. 24, at 8 p. m. A paper was presented by Mr. Charles P. Steinmetz on "Notes on Single Phase Induction Motors and the Self Starting Condenser Motor," and one by Mr. Fitzhugh Townsend on "A New Method of Tracing Alternating Current Curves." Applications have been received from 14 candidates for associate membership, which will be acted on by the Executive Committee at its meeting Feb. 28.

National Association of Freight Commissioners.

This Association held its third annual meeting in New York Jan. 20, and the following officers were elected: President, W. P. Trickett of Kansas City; Vice-Presidents, F. W. Maxwell of St. Joseph, and R. S. Lyon of Chicago; Secretary, L. B. Boswell of Quincy, Ill.; and Treasurer, C. O. Townsend of St. Paul.

Resolutions were adopted endorsing the bill recently introduced in Congress by Senator Cullom, and declaring that if Congress does not speedily act, the Interstate Commerce Commission ought to be abolished, as a useless public body.

Dry Dock Association.

The Dry Dock Association of the Lakes held its annual convention at Detroit Jan. 16, and readjusted the rates and charges of last year with the additional provision that 3 per cent. be deducted if bills are paid within 30 days. The charges for dockage are 20 cents a ton up to 500 tons, and 10 cents a ton over 500 tons. Six cents a ton a day will be charged for the time the vessel occupies the dock. The officers elected were: J. C. Wallace of Cleveland, President; Edward Smith of Buffalo, Vice-President, and James E. Davidson of Bay City, Mich., Secretary and Treasurer.

Master Car Builders' Association.

The Arbitration Committee requests members of the Association and railroad clubs who have suggestions to make as to the revision of the Rules of Interchange at the next convention to send them to Secretary J. W. Taylor, Rookery, Chicago, by Apr. 21.

Few changes were made at the last annual convention and very gratifying results have followed. The number of cases decided during the last three years has been as follows: Year to September, 1897, 111 cases; to September, 1898, 38 cases; to September, 1899, 35 cases. Of the cases decided since September, 1899, none have arisen under the rules now in force.

Technical Club.

At the annual meeting of the Technical Club, Chicago, on Tuesday evening, Jan. 16, the following officers were elected for the ensuing year: President, C. F. Quincy; Vice-President, C. E. Billin; Second Vice-President, A. Sorge, Jr.; Treasurer, E. C. Darley; Directors to serve until 1903, A. W. Fiero, E. M. Hagar, A. V. Powell and L. E. Ritter. A. C. Stites was elected to serve until 1902. The report of the Treasurer showed that the past year had been the most prosperous in the history of the club. After the election Mr. Isham Randolph gave an informal luncheon to the new officers.

The Civil Engineers' Society of St. Paul, Minn.

The sixteenth annual meeting of the Civil Engineers' Society of St. Paul was held in Parlor B, Windsor Hotel, at 8.30 p. m., Jan. 15. Fifteen members and nine visitors were present. The annual reports of the officers were read and accepted. On recommendation of the Government of the Society the dues for 1899 were remitted. The Librarian was authorized to have the periodicals of the past year bound. The following officers were elected: President, Capt. A. O. Powell; Vice-President, A. W. Münster; Secretary, C. L. Annan; Treasurer, A. H. Hogeland; Librarian, C. A. Winslow; Representative on Board of Managers of the Association of Engineering Societies, Geo. L. Wilson. Mr. W. A. Truesdell read a paper on the Life of Archibald Johnson, late member of the Society. After adjournment a social hour was spent in the dining room.

Car Foremen's Association of Chicago.

A meeting of the Car Foremen's Association of Chicago was held on Thursday evening, January 11. There were 59 members present. Mr. W. C. Cook resigned as Secretary of the Association, and Mr. A. Kline, Chief Clerk in the Car Department of the Chicago, Milwaukee & St. Paul, was elected to that office ;the address of the new Secretary is 702 Maplewood Ave., Chicago. The question as to whether defects in longitudinal sills of refrigerator cars should be considered as concealed defects, brought out a spirited discussion, the opinions being about equally divided but no definite decision was reached. Another subject was the question as to who was responsible for the breakage of American continuous drawbar keys in connection with broken draft timbers. It was finally decided by a vote of 31 to 19 that owners should be held responsible. An interesting paper on "Defects of Uncoupling Devices," was presented by Mr. Groobey, which will be discussed at the next meeting.

Lake Carriers' Association.

The ninth annual convention was called to order at the Hotel Cadillac, Detroit, Jan. 17, and continued on Jan. 18. About 75 members were present. Mr. Charles H. Keep, Secretary, read the report of the Board of Managers showing an increase in the tonnage represented in the Association of 75,000 tons over 1898 and 40,000 tons over 1896, the best previous year. The proposed plans for raising the lake levels were discussed at length and the managers recommended that the lake carriers work for the appointment of a joint American-Canadian Committee to consider the matter. A committee was appointed to go to Washington and urge upon Congress the necessity of the projected improvements in the Soo River, Lake St. Clair channel and the Lime Kilns crossing of the Detroit River, and to ask Congress for an additional revenue cutter for service in the Soo River. A special committee of 11 members was appointed to receive bids for the grain shoveling contract at Buffalo. A plan is under discussion by which the elevators may handle the grain themselves.

Engineers' Society of Western Pennsylvania.

The twentieth annual meeting of the Engineers' Society of Western Pennsylvania was held in the lecture room of the society's house, 410 Penn Ave., Pittsburgh, Pa., Tuesday evening, Jan. 16. The new officers elected for the ensuing year are: President, one year, W. A. Bole; Vice-President, two years, C. F. Scott; Directors, two years, Gustave Kaufman, C. B. Albree; Secretary, one year, R. A. Fessenden; Treasurer, one year, A. E. Frost. The President, Mr. Harry J. Lewis, read his retiring address, in which he touched on the changes in the economic conditions which have taken place during the last twenty years. The membership is now over 400.

At the regular monthly meeting which followed, the principal business consisted of the appointment of a committee to devise means for the purchase of a permanent home for the society. It was suggested that the surplus of $500 be reserved as a nucleus for this fund, and a number of liberal subscriptions amounting in all to $500 were made by members present. It is thought that within a few months a sufficient sum will be secured to render the purchase of a new home certain.

New York Railroad Club.

The regular monthly meeting of the New York Railroad Club was held Thursday evening, the 18th. The subject discussed was "Lubrication," which was to have been opened by General Miller, President of the Galena Oil Company. As he could not come until about half an hour after the meeting was called, Mr. Hodges, Purchasing Agent of the Long Island Railroad, opened the discussion, and several other members talked until the stated speaker of the evening arrived.

General Miller spoke somewhat of the elements of good lubrication and of the efforts of the Galena Oil Company to spread the knowledge of the art, and various members followed him in a discussion which was continued until nearly 11 o'clock. It was, however, fragmentary, and while suggestive, not nearly so satisfactory as it might have been had the topic been introduced by a carefully digested paper.

Mr. Hodges mentioned, as illustrating the possibilities of good packing and good oil, a case where a car with the boxes sealed ran seven months, making a total of 31,000 miles without the boxes being opened. These were packed with a patented so-called elastic fiber, being largely good carpet yarn and black Galena oil. This performance seemed to tax the credulity of the members somewhat and therefore Mr. Hodges told them of a still more remarkable case in which a car ran from Washington to Richmond and back with no packing at all in one of the boxes.

Mr. Hayward, of the Pennsylvania, and Mr. McCarthy, of the Galena Company, spoke of the importance of not packing the boxes too tight, which is one of the most common mistakes and which results in a glaze on the surface of the packing in contact with the journal and simply wiping the oil off the journal.

President Vreeland invited the Club to meet for the February meeting at the rooms of the Metropolitan Street Railway Association, 50th Street and Seventh Avenue. On that occasion Prof. Durand, of the International Correspondence School, will give an elementary lecture on "Electricity," and it is desirable to have the lecture at the rooms of the Street Railway Association because a complete car equipment is installed there and can be used for illustrating the lecture.

Railway Transportation Association.

The winter meeting of this association was held at the Southern Hotel, St. Louis, Wednesday, January 17, representatives being present from railroad lines throughout the country. The meeting was presided over by the President, Mr. C. B. Adams, Superintendent Transportation of the Wabash. The entire time of the association was devoted to the consideration of committee reports, the sessions lasting from 10.30 a. m. until 6 p. m., with intermission for lunch.

The Executive Committee reported membership of 81,006 miles, 645,412 freight cars.

The report of the Committee on Car Service pertained especially to the subject of "Reweighing and Stenciling Light Weight on Freight Cars," presenting in this connection some interesting figures, indicating that the depreciation in light weight, as a rule, ceases by the end of the third year after the car is placed in service. With this fact in view the committee offered a resolution to the effect that (1) new cars should be stenciled with actual light-weight, and date of same, when built; and should be re-weighed and re-stenciled in both second and third years thereafter. (2) Any car found without such stenciling, or receiving repairs of such a nature as to make a change in weight of car, should be weighed and stenciled, and new weights of foreign cars should be reported to car owners. (3) The Car Service Department should be given supervision over the work of re-light-weight.

Considerable revenue may be saved to railroad companies by giving this matter attention. One writer estimates the annual savings to be derived from correct light weights as amounting to over $10,000 on each 1,000 cars of new equipment. Under the prevailing method of rating engines on a tonnage basis, it is very necessary that every car handled should be stenciled with correct light-weight in order to acurately ascertain train tonnage."

The Committee on Movement of Trains on a Tonnage Basis requested that in considering this subject the association should give an expresion of opinion as to what constitutes "a train" and what conconstitutes "train mileage" for tonnage statistical purposes. These questions were discussed at considerable length and suggestions were made to the committee on which to base their further consideration and recommendation on this subject.

The reports of the other committees, after being given due consideration, were referred back to the several committees for further consideration and recommendation at the summer meeting.

New subjects as follows were referred to Standing Committee for investigation and recommendation:

1. Limiting the Class and Size of Freight Cars.
2. Building and Handling High-Class Freight Trains.
3. Switched Cars and the Best Method of Handling Switching Accounts.

A new committee was authorized to formulate a "Recommendation as to a First Choice and a Second Choice Plan of Settlement for Car Hire."

Through the courtesy of the Central Association of Railroad Officers, the members of the Transportation Association were escorted by a committee of the Central Association through the St. Louis and East St. Louis Terminal yards on the morning of Thursday, January 18th.

The next regular meeting of this association will be held at Detroit, July 18th.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. Arthur G. Leonard has been elected General Manager of the Union Stock Yards & Transit Company, in Chicago.

—Mr. W. E. Barnett, recently elected Third Vice-President of the New York, New Haven & Hartford, is seriously ill at his home in New Haven, Conn.

—Mr. Halsey J. Boardman died Jan. 15, at his home in Roxbury, Mass. He was born in Norwich, Vt., in 1835. In 1894 he was Vice-President of the Duluth & Winnipeg, now part of the Great Northern.

—Mr. B. L. Fleming, at one time General Freight and Passenger Agent of the Baltimore, Chesapeake & Atlantic, dropped dead near Chester, Pa., last

week. He was born near Harrington, Del., and was in his 59th year.

—Mr. R. K. Cassatt, Assistant to the President of the New York, Philadelphia & Norfolk, son of Mr. A. J. Cassatt (President of the Pennsylvania Railroad) and Miss Minnie D. Fell were married Jan. 22, at Whitemarsh, Pa.

—Mr. R. H. Nicholas, who on Jan. 1 resigned as Superintendent of the New York, Philadelphia & Norfolk on account of ill health, died at Philadelphia, Pa., Jan. 23, of pneumonia. Mr. Nicholas was 46 years of age and a native of Baltimore.

—Mr. Francis A. Healy, the new Auditor of the Atlanta & West Point, has had 20 years of railroad service. He has served with the Atchison, Topeka & Santa Fe, the Santa Fe, Prescott & Phoenix, the South Carolina & Georgia, the Ogdensburg & Lake Champlain and the Augusta Southern. He is an expert accountant and most of his service has been in the Auditor's office. After the sale of the South Carolina & Georgia, last year, he went into the offices of the Southern, at Washington, as Assistant Auditor, and occupied that position until his recent appointment.

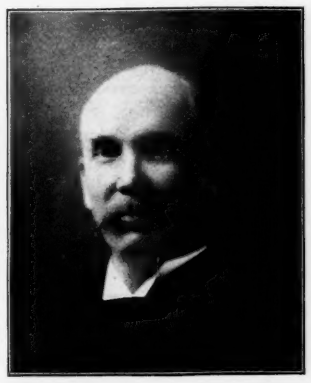
—Mr. C. C. Burnett, Superintendent of the Worcester Division of the New York, New Haven & Hartford, died from an acute attack of typhoid fever after three weeks' illness, at his home in Providence, Jan. 17. He was born in Southboro, Mass., 35 years ago and was graduated from Harvard University in 1886. His first railroad service was in the West, but in 1891 he was made Trainmaster of the Old Colony Road at Fox Point, Providence, R. I. He continued service with the Old Colony until its absorption into the New York, New Haven & Hartford, and in 1894 was appointed Assistant Superintendent of the Worcester Division. In June last he succeeded Mr. Spencer as Superintendent of the same division.

—Press dispatches report the death at St. Louis, on Jan. 21, of Mr. A. J. Vanlandingham, Commissioner of the St. Louis Traffic Bureau. Mr. Vanlandingham was 47 years old and had been in St. Louis about three years. Before that time (1889 to 1897) he was Commissioner of the Transportation Bureau at Kansas City. This Bureau was one of the earliest organizations established by merchants for fostering their interests as related to transportation. An essential element in the success of such an organization is the presence at its head of a man who is thoroughly acquainted with the details of railroad traffic; in other words, a man who has had experience in railroad management. Mr. Vanlandingham was such a man and he is, therefore, to be classed as one of the pioneers in this branch of commercial development. His successful conduct of the business at Kansas City led to his being called to the larger field in St. Louis. Mr. Vanlandingham's railroad career began in 1870, and for the first few years he served different southwestern roads. In 1882 he was appointed Assistant General Freight Agent of the Little Rock & Fort Smith (St. Louis, Iron Mountain & Southern) and one year later General Freight Agent of the same road. Later he was Assistant General Freight Agent of the Kansas City, Fort Scott & Memphis, which place he left to go to the Kansas City Bureau.

—The new Mechanical Engineer of the Great Northern, Mr. Max Toltz, was born in 1857. He was graduated from the technical schools in Berlin in 1878, and for the three years following was Assistant Engineer of River and Harbor Improvements and Fortifications for the Russian Government. During his school life he was engaged for a year with the Blasendorf Machine Shop & Foundry in Practical work in the draughting room. Coming to this country, he entered railroad service with the Chief Engineer of the St. Paul, Minneapolis & Manitoba, now the Great Northern, in May, 1881, as Draughtsman and Assistant Engineer. In 1886 he took a similar position in the office of the Chief Engineer of the Chicago, Burlington & Northern. In December of the same year he was made Engineer in charge of construction of sewers in St. Paul. He held that position until August, 1890, when he became Principal Assistant Engineer of the Minneapolis Western Ry. The following year he returned to the Great Northern as Assistant Engineer in charge of bridge work, and four years later was promoted to Bridge Engineer, the position he held at the time of his recent change. During the past three years he has been in charge of designing steel cars and trucks of different types. He has designed coal handling plants, steel grain elevators with all the machinery, and electric power plants. He also prepared plans of both electrical and gas lighting of passenger cars.

—The first railroad experience of Mr. Samuel Rockwell was as a flagman in 1864. He is now Principal Assistant Engineer of the Lake Shore & Michigan Southern. He was born in Brooklyn, N. Y., Feb. 20, 1847. After spending six months with a locating party on the Adirondack RR., in 1864, he was for six years at sea, becoming chief officer of a ship at 21 years of age. He entered Sheffield Scientific School in 1870 and was graduated three years later. During that time he had practical experience in railroad surveying for the St. Paul & Pacific, and for the Green Bay & Lake Pipin. Immediately after graduation he entered the employ of the Delaware, Lackawanna & Western, at Hoboken, N. J., and three months later was made Resident Engineer of the tunnel through Bergen Hill and engineering work in that locality. During the eight years following 1877 he was variously employed on municipal water supply and general engineering practice. In the fall of 1885 he took out a locating party for the St. Paul, Minneapolis & Manitoba, and a year later, as Chief Engineer, located and built the Aberdeen, Fergus Falls & Pierre. For three years, until 1890, he was Chief Engineer of the Eastern Ry. of Minesota, locating and building that road and its terminals at West Superior and Duluth. He surveyed the proposed extension of the Atlantic & Pacific from San Francisco, and then returned to Minnesota, where he was made Chief Engineer of the Duluth & Winnipeg. While locating the extension from Cloquet to West Duluth he accepted the position of Engineer of the Michigan Southern Division of the Lake Shore & Michigan Southern, in August, 1891, and held that position until his recent advancement in the same company.

—Twenty-three years ago Mr. H. R. Williams was a telegraph operator on the Chicago, Milwaukee & St. Paul. To-day he is about to become the General Manager of the entire system. Mr. Williams was born at Palmyra, Wis., July 14, 1849. He entered service with the Chicago, Milwaukee & St. Paul on Jan. 1, 1867, and has remained with that company ever since. As a telegraph operator he was employed at various stations in Wisconsin until Nov. 14, 1872, when he was made Train Dispatcher at Minneapolis. In 1881 he was appointed Trainmaster, and a year later Superintendent of the Iowa & Minnesota Division. In 1885 he was made Superintendent of the Southern Minnesota Division, and three years later of the Kansas City Division. He became Assistant General Superintendent in charge of the Northern District in 1890, and General Superintendent at Chicago in 1898. He will probably assume the duties of his new position about Feb. 1.



ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—Geo. A. Hancock, Assistant Superintendent of Machinery, will soon retire.

Baltimore & Ohio.—The F. M. & P. District, Ohio & Baltimore Short Line and Connellsville terminals will be included in the Connellsville Division. All reports and communications heretofore addressed to Superintendent J. Barron will be sent to Superintendent J. S. Norris, at Connellsville, Pa. Effective Jan. 15. F. W. Deibert has been appointed Assistant Mechanical Superintendent, with headquarters at Newark, O., to succeed I. N. Kalbaugh, transferred to Glenwood, Pa.

Bradford Central.—At a meeting of the stockholders, held Jan. 15, Geo. W. Adams, Chas. L. Tracy, E. F. Kizer, E. J. Angle and F. A. Sawyer of Towanda, Gen. J. A. Hill of Powell, I. N. Beardslee, C. A. Innes and Hugh Crawford of Canton, F. H. Goodyear and C. W. Goodyear of Buffalo, were elected Directors. (RR. Construction column, Dec. 22, 1899, p. 888.)

Chicago & Alton.—W. J. Bennett has been appointed Master Mechanic at Slater, Mo.

Chicago & Northwestern.—The position of Resident Engineer at Butterfield, Minn., is abolished.

Chicago, Milwaukee & St. Paul.—H. R. Williams, heretofore General Superintendent, has been appointed General Manager, to succeed W. G. Collins, resigned, and W. J. Underwood, heretofore Assistant General Superintendent at Minneapolis, will succeed Mr. Williams.

Cleveland, Cincinnati, Chicago & St. Louis.—W. S. Moore, Engineer Maintenance of Way at Wabash, Ind., has been transferred to Cleveland, O., to succeed S. W. Hayes, resigned. R. H. Simpson succeeds Mr. Moore at Wabash.

Coos Bay, Roseburg & Eastern.—The officers of this company referred to in the News column are: President, A. B. Spreckels; Vice-President, F. S. Samuels; Secretary and General Manager, W. S. Chandler.

Duluth, South Shore & Atlantic (Canadian Pacific).—Thomas W. Smith has been appointed Assistant Superintendent of the Mackinaw Divisions of the D., S. S. & A., and of the Mineral Range.

Gulf, Colorado & Santa Fe (A., T. & S. F.).—J. H. Johnston has been appointed Assistant General Freight Agent.

Lehigh Valley.—J. S. Lentz has been appointed Master Car Builder. Mr. Lentz, as is known to nearly all of our readers, has been for many years on the Lehigh Valley in charge of the car department. In recent time he has been Assistant Superintendent of Motive Power in charge of car work. The concentration of car shops confines passenger and freight car work to Sayre and coal car repairs to Packerton, and the office of Superintendent of Motive Power is discontinued. Mr. Lentz has charge of the car shops at Packerton and also of the small repair shops at Perth Amboy.

Louisville & Nashville.—Regarding the appointment of T. E. Brooks as Superintendent of the Alabama Mineral Division (E. & A., Dec. 22, 1899, p. 888) while correct at the time made, was premature, matters having arisen which made the change inexpedient. Mr. Brooks will, therefore, remain in charge of Traffic and Transportation on the same Division. James P. Whiskeman has been appointed Assistant Engineer at Louisville, Ky.

New York Central & Hudson River.—S. W. Hayes, heretofore Engineer Maintenance of Way of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed Division Engineer of the Western Division at Buffalo, N. Y., of the N. Y. C. & H. R., to succeed E. F. Van Hoesen, resigned. Effective Feb. 1.

Norfolk & Portsmouth Belt Line.—W. A. Patton (President of the New York, Philadelphia & Norfolk) has been elected President of the N. & P. B. L., to succeed A. J. Cassatt, resigned.

Northern Alabama (Southern).—The office of Assistant General Freight Agent is abolished, effective Feb. 1.

Oregon Midland.—The officers of this newly incorporated company are: President, G. T. Baldwin; Vice-President and General Manager, L. W. Van Horn; Secretary, R. S. Moore; Treasurer, David Horn; Auditor, Freight and Passenger Agent, W. J. Woods; Attorney, H. L. McWilliams, and Chief Engineer, J. A. McCall. (RR. Construction Column, Nov. 17, 1899, p. 801.)

Pennsylvania.—John L. Mohun, heretofore Assistant Master Mechanic at Juniata Shops, Altoona, Pa., has been appointed Master Mechanic at Lambertville Shops of the United RR. of New Jersey Division, succeeding Richard McDowell, retired, effective Jan. 15. C. J. Carroll, Acting Superintendent of Ferries, has been appointed Superintendent of Ferries.

Pullman Company.—C. R. Wager has been appointed Superintendent of the New York Division at New York.

Santa Fe, Prescott & Phoenix.—F. E. Davisson, who has been Acting Master Mechanic, has been appointed Master Mechanic of the S. F., P. & P., and the Prescott & Eastern.

Southern.—A. D. Sams has been appointed Supervisor of Bridges & Buildings at Tuscumbia, Ala., succeeding J. Y. Hill.

RAILROAD CONSTRUCTION.
New Incorporations, Surveys, Etc.

ARKANSAS WESTERN.—Building is begun, according to report, on this proposed line from Howe, I. T., on the Kansas City, Pittsburgh & Gulf, to run southeast about 36 miles to Waldron, Ark. C. C. Godman of Fort Smith, Ark., is President. (Dec. 29, 1899, p. 901.)

ATKINS, CULVER & PITBEADO.—Solicitors of Winnipeg are applying to the Manitoba Legislature to build this line from a point on the Pembine Branch of the C. P. R. at Morden, to run south to the International line.

BIG SANDY & CUMBERLAND.—The bill to incorporate this company has passed both houses of the Virginia Legislature. The company, with a capital stock of $100,000, proposes to build from a point on the Kentucky line in the County of Dickenson or Buchanan, thence to the Clinch River or to a connection with the Norfolk & Western. Among the incorporators are: C. W. Adams, Isaac T. Mann and W. M. Ritter. (Jan. 19, p. 47.)

BRACEBRIDGE & TRADING LAKE.—James Boyer of Bracebridge, Ont., is applying to the Ontario Parliament for permission to incorporate this company to build a line from Bracebridge to a point on Muskoka Lake in the Township of Monck, District of Muskoka.

BUFFALO, ROCHESTER & PITTSBURGH.—Ryan & Lauer are reported building the second track between Bradford, Pa., and Riverside Park.

CHESAPEAKE & NORTHERN.—A bill has been introduced into the Maryland Senate to incorporate this company, with a capital stock of $500,000, to build a railroad from a point on Chesapeake Bay, to run northwest through Rockville, Gaithersburg, Frederick, Thurmont and Emmitsburg to a point on the Pennsylvania boundary in Frederick County. Among the incorporators are Chas. F. Goodell, Chas. S. Howard and Alonzo T. Marsh.

CHICAGO & NORTHWESTERN.—A Western press report states that the company will build a new line between Sioux City and Omaha. There will be a cut-off from Sioux City south about 50 miles to Tekamah, Neb., to take the place of the Sioux City & Pacific. From that point the 42 miles to Omaha will be over the Chicago, St. Paul, Minneapolis & Omaha line. This will effect a saving of about 32 miles.

CHICAGO, BURLINGTON & QUINCY.—Edward Gillet, an Engineer of Sheridan, Wyo., has been awarded the contract, according to report, to survey several hundred miles of extension from Fort Custer, Mont., southwest up the Big Horn River to the Big Horn Hot Springs, and ultimately to the eastern edge of the Yellowstone National Park, Wyo. The line will pass through a rich farming district.

See also Fairfield & Ottumwa and Murray & Creston, below.

CHICAGO, MILWAUKEE & ST. PAUL.—An extension is being considered, according to report, from the main line at Randon Lake or Waldo, Wis., to run northeast 15 or 20 miles to Sheboygan. This may be under the charter of the Sheboygan & Western incorporated some time ago by A. Mendelsohn of Grand Rapids, Mich., and Jerry Donohue of Sheboygan. (Jan. 27, 1899, p. 753.)

CHICAGO, ROCK ISLAND & PACIFIC.—An extension is to be made, according to report, from Ruthven, Ia., northwest about 25 miles via Spencer to Spirit Lake.

COLUMBUS, BLOOMINGTON & TERRE HAUTE.—Surveys are completed and estimates are being made for contracts to build this proposed line from Columbus, Ind., west about 85 miles via Bloomington to Terre Haute. There will be three iron bridges. Edwin S. Brodix of Bloomington, Ind., is President. (Official.)

DALLAS & NEW MEXICO.—This company, whose incorporation was noted two weeks ago is to succeed to the old Dallas & Pacific, under which charter about 68 miles of the proposed line was graded from a point six miles out of Dallas to Bonneville, some years ago. The proposed route is from Dallas west about 500 miles to the State line. The principal office is Dallas.

DELAWARE VALLEY & KINGSTON.—A meeting of the New York State Railroad Commission will be held on Jan. 30, to consider the application of this company to build along the old Delaware & Hudson towpath from Hawley, east to Rondout, N. Y. Wm. V. S. Thorne of 1 Broadway New York, is President. (Nov. 24, 1899, p. 819.)

DYEA & CHILKOOT.—This company was incorporated at Olympia, Wash., Jan. 15, with a capital stock of $50,000, to build a railroad from Dyea, Alaska, at the head of Lynn Canal, north 17 miles to the summit of Chilkoot Pass. The principal office is Tacoma, Wash. Michael King and Thomas B. Wallace of Tacoma are trustees.

ENSLEY SOUTHERN.—This company has been incorporated in Alabama by officers of the Southern Ry., to build a railroad from Parrish, Ala., the terminus of the Northern Alabama line of the Southern, to run southeast 35 miles to Ensley. Preliminary

surveys were made in November and December, 1899, and final surveys will be made in February.

FAIRFIELD & OTTUMWA.—This company has been incorporated in Iowa, with a capital stock of $1,000,000, by officers of the Chicago, Burlington & Quincy, to build the double-track line of that company between Fairfield, Ia., and Ottumwa.

HALIBURTON, WHITNEY & MATTAWA.—Surveys are in progress for this proposed line from Haliburton, Ont., to run north about 100 miles to Mattawa. The company expects to build its line this summer. Messrs. Gordon & Sampson of Toronto, Ont., were the solicitors for the incorporation. (March 10, 1899, p. 179.)

HILGARD, GRANITE & SOUTHWESTERN.—W. T. Chalk is surveying this proposed line from Hilgard, Ore., to run south 60 miles to Granite. J. M. Church, cashier of the La Grande (Ore.) National Bank is interested. The central office is La Grande. (Jan. 19, p. 48.)

HOUSTON, BRAZOS & NORTHERN.—Building is to be begun at once, according to report, on five miles of this line from Houston, Tex., north along the Brazos Valley. The road is projected to Fort Worth and thence to Tishomingo, I. T., 400 miles. The company controls the Texas Western. (Nov. 17, 1899, p. 800.)

IDAHO MIDLAND.—P. W. McElroy, Chief Engineer, is making surveys for this proposed line from Boise City, Idaho, northeast about 300 miles to Butte, Mont. It was incorporated in Idaho last June. Thomas W. Bates of Boise is President. (June 30, 1899, p. 483.)

INTERNATIONAL & GREAT NORTHERN.—Citizens of Quitman, Tex., are asking this company to extend its line north through their city to a point on the St. Louis Southwestern, either at Sulphur Springs or Mount Pleasant.

LOUISVILLE & NASHVILLE.—Incorporation papers have been filed with the Alabama Secretary of State for the extension of the Northern Alabama from Cullman on the main line, to run south about 74 miles to Bessemer.

MARLBORO, MARION & HORRY.—A bill has been introduced into the South Carolina Senate to amend the charter of this company so as to build this line from a point on the Seaboard Air Line, either Gibson, Osborne or Kollock, to run south via Bennetsville, Blenheim and Drake to Marion. A. J. Matheson is President.

MISCELLANEOUS COMPANIES. — The Algoma Comercial Co., Ltd., has been incorporated in Canada, with a capital stock of $10,000,000, to build railroads, etc. The principal office is Sioux Ste. Marie, Ont. Among the incorporators are Francis H. Clergue and H. C. Hamilton, Sioux Ste. Marie; and E. S. Douglas, Philadelphia, Pa. This is probably in connection with the Algoma Central now building.

MISSOURI, KANSAS & TEXAS.—The Grigsby Construction Co. of Jefferson, Tex., have the contract for the Sherman, Shreveport & Southern extension from Jefferson, Tex., southeast 28 miles to Waskom. (Jan. 12, p. 30.) The work is of an ordinary character. (Official.)

MURRAY & CRESTON.—This company was incorporated in Iowa Jan. 19, with a capital stock of $2,000,000 by officers of the Chicago, Burlington & Quincy, to build a double track line between Murray, Ia., and Creston, 25 miles.

MUSCATINE, TIPTON & NORTHERN.—Surveys are being made for a line under this title from Muscatine, Ia., to run northwest about 100 miles via Moscow, Tipton, Olin, Newport, Anamosa, Prarieburg and Cogen to Independence, the junction of the Illinois Central and the Burlington, Cedar Rapids & Northern. Surveys are completed from Muscatine to Tipton. T. B. Downer of Muscatine is Engineer in charge.

NEW YORK, NEW HAVEN & HARTFORD.—The Common Council of New Rochelle, N. Y., is considering the question of improvements in that city to be made by this company, including a better approach to the station at Mechanic St., and approaches in Central Ave.

NORFOLK & WESTERN.—This company is reported to have bought the right of way of the Abingdon & Damascus RR., from Abingdon, Va., southeast 17 miles to Damascus. It was graded several years ago.

NORTHWESTERN ELEVATED, CHICAGO.—The work of completing the road was resumed on Jan. 17 and regular trains will not be run until the structure is finished. The line from Lake St. to Wilson Ave., with temporary stations, must be finished by May 31, and permanent stations must be finished by Jan. 1, 1901.

PENNSYLVANIA.—An officer writes that nothing is known whatever by the company as to the reported extension from West Brownville, Pa., to Bentleyville. (Jan. 12, p. 30.)

Surveys are reported in progress for an extension from Vintondale, Pa., to run west about 15 miles to Black Lick on the Indiana Branch.

PENNSYLVANIA COMPANY.—Sealed proposals are asked by the Chief Engineer at Pittsburgh, Pa., until noon Jan. 20, for grading about two miles of second track and sidings at Bedford, O., on the Cleveland & Pittsburgh. Bids must be accompanied by a certified check for $2,000, and on blanks furnished by the company. Profiles, specifications, etc., are on file at the company's office.

PENNSYLVANIA ROADS.—A railroad company in the State which operates two divisions, desires to build a connecting line 17 miles long, of easy grade, containing two small bridges. Surveys are completed and map and profile made. Weight of rails, 60-lb. new, or 68-lb. first-class re-layers. Bids are asked at Philadelphia, Pa., Lock Box 118. (See our Advertising columns.)

PITTSBURGH, WESTMORELAND & SOMERSET.—Building has been resumed on this line beyond Mechanicsburg, Pa. It was completed from Ligonier, Pa., southeast to Mechanicsburg, and is to run through Laurel Mountain to Somerset. Captain N. Byers of Williamsport, Pa., is General Manager. (Oct. 27, 1899, p. 753.)

PLANT SYSTEM.—Extensive improvements are reported under way at Quitman, Ga., including the lowering of the tracks several feet.

RIO GRANDE WESTERN.—An officer writes that there is no truth in the report that the company will build a cut-off between Wellington, Utah, and Helper. (Jan. 12, p. 30.)

ST. LOUIS, TROY & EASTERN.—A mortgage has ben made by this company to Breckenridge Jones of the Mississippi Valley Trust Co. as trustee, to secure $600,000 of 6 per cent. bonds. The proposed line is from East St. Louis, Ill., to Venice and Collinsville. It has been referred to heretofore under St. Louis, Collinsville & Eastern. (Aug. 5, 1899, p. 604.) W. S. Forman is President and D. M. Browning Secretary, both of East St. Louis, Ill.

SOUTHERN PACIFIC.—Application has been filed in the United States Land Office at Independence for right of way for the extension from Mojave, Cal., north about 100 miles to Keeler, on the Carson & Colorado. Several surveys have been made in that section—one reported by the Carson & Colorado to run south to Johannesburg on the Randsburg line. The Randesburg is also said to have made surveys in the same territory.

TORONTO & COLLINGWOOD.—Mortimer Clarke of Toronto, Ont., has applied to the Canadian Parliament for an act to incorporate this company to build from Toronto northwest about 100 miles to Collingwood on the Gergian Bay.

UNION PACIFIC.—An officer writes that the company does not intend at present to reduce any of the grades between Denver, Col., and Cheyenne, Wyo., nor between Atkins and Cheyenne. During the past year a number of surveys have been made, but nothing definite is determined. (Jan. 13, p. 30.)

UTAH & PACIFIC.—Contracts are let, according to report, for about 80 miles of the Utah, Nevada & California extension from the Utah Line at Uvada, to run southwest across Nevada to Los Angeles, Cal. A. W. McCune is President. (Sept. 8, 1899, p. 633.)

VENANGO.—This company was incorporated in Pennsylvania Jan. 19, with a capital stock of $60,000, to build a railroad from Franklin to the Borough of West End, six miles. The directors are: John B. Smithman (President), A. F. Smithman, H. W. Dunn, H. U. Wagner, L. M. Davison and W. J. Gealy, all of Oil City.

VIRGINIA & SOUTHWESTERN.—Improvements are reported in progress at Elizabethton, Tenn., in connection with the extension of this company.

WASHINGTON & POTOMAC.—A bill has been introduced in the Maryland Legislature to extend the time for building this road, which expires next year. The road is projected from Point Lookout on Chesapeake Bay, north 80 miles to Washington, D. C. (Railroad News column, Nov. 10, 1899, p. 788.)

WEST VIRGINIA CENTRAL & PITTSBURGH.—Rosser, Coleman & Hoge of Louisville, Ky., have received the contracts for the two tunnels on the Coal & Iron extension from Elkins, W. Va., south 43 miles to the forks of the Greenbrier River. One tunnel is 1,600 ft. long and the other 950 ft. C. H. Latrobe, Room 813 Merchants' Bank Bldg., Baltimore, Md., is Consulting Engineer. (C. & I., Dec. 29, 1899, p. 901.)

WEST VIRGINIA ROADS.—Surveys are reported in progress for a line from the Dry Fork RR., to run along Red Creek to a sawmill at Jetroy owned by the Bush Co.

WHEELING & LAKE ERIE.—New 70-lb. rails, according to report, are being laid from Warrenton, O., west 26 miles to Jewett, and for 10 miles between Clarksfield and Norwalk on the extension to Huron Junction.

GENERAL RAILROAD NEWS.

CALIFORNIA & NEVADA.—An effort was made before Judge Morrow at San Francisco Jan. 8, to set aside the suit of Chas. H. Smith under which the road was thrown into the hands of a receiver in May, 1896. There are two suits pending. That of Smith against the railroad charges the officers of the company with illegally issuing $200,000 of bonds to themselves for services as officers of the road, and asking that the bonds be declared void. The other suit is of the Central Trust Co. to foreclose $500,000 of bonds, including $200,000 referred to above. The line runs from Oakland, Cal., to Bryants, 23 miles.

CHICAGO & GRAND TRUNK.—The trustees of the reorganization plan have given formal notice that bonds in excess of a majority of each class have been deposited under the reorganization plan. Further deposits will be received by Glynn, Mills, Currie & Co., 67 Lombard St., London, or by the Bank of Montreal, Que. (Nov. 10, 1899, p. 788.)

CHICAGO, BURLINGTON & QUINCY.—Seventy-eight Denver extension 4 per cent. bonds due Feb. 1, 1922, for $1,000 each, and 15 for $100 each have been drawn for payment at the office of the New England Trust Co., Boston, on Feb. 1 at par, interest to cease from that date. (Jan. 5, p. 14.)

COOS BAY, ROSEBURG & EASTERN.—J. D. Spreckels & Bros. of San Francisco write with reference to their control of this property, that on Dec. 8 all the capital stock and bonds of the road which had been pledged as security for money advanced by them, became theirs through failure of the holder to redeem his securities and they are now in possession of the property. The officers are given under Elections and Appointments. (Dec. 29, 1899, p. 902.)

DENVER & SOUTHWESTERN.—The temporary injunction granted by Judge Stimson of the District Court of Teller County, Colo., on Nov. 29, to prevent the consolidation of a number of companies under this title was dissolved by Judge Dixon at Colorado Springs Jan. 12. The companies to be consolidated are: The Florence & Cripple Creek, the Midland Terminal, the Canyon City & Cripple Creek, the Metallic Extraction, the La Bella Mill, Water & Power and the Colorado Trading & Transfer companies. The consolidated company will include 127 miles of railroad, and will issue $5,000,000 of stock and $5,500,000 of bonds. (Dec. 8, 1899, p. 854.)

DULUTH, MISSABE & NORTHERN.—Seventy-five first consolidated mortgage bonds of Jan. 1, 1893, have been drawn for payment at the Central Trust Co., New York, interest to cease Feb. 2. (Jan. 12, p. 30.)

FITCHBURG.—President Lucius Tuttle of the Boston & Maine, has written a letter to E. D. Codman, President of the Fitchburg, withdrawing the offer of his company to lease the Fitchburg on the ground of the opposition of the State Directors of the Fitchburg. (Jan. 12, p. 30.)

GALVESTON, HOUSTON & NORTHERN.—The Texas Secretary of State has registered all but $5,000 of the $800,000 first mortgage bonds of the company, which is successor to the Galveston, La Porte & Houston. The company has also asked the registration of $200,00 of stock. (Aug. 11, 1899, p. 576.)

KENTUCKY & INDIANA BRIDGE.—This property was sold at public auction on Jan. 18 for $700,000, subject to a $1,000,000 mortgage, to A. P. Humphrey of Louisville, Ky., representing the Southern Railway, and Judson Harmon of Cincinnati, representing the Baltimore & Ohio Southwestern. The road went into the hands of a receiver Oct. 14, 1893. (Dec. 29, 1899, p. 902.)

NEW YORK CENTRAL & HUDSON RIVER.—With reference to the Vanderbilt control of the Lake Erie & Western and the Cleveland, Cincinnati, Chicago & St. Louis, S. R. Callaway, President of the New York Central, makes the following statement:

The directors considered carefully the possibility of the control of the Lake Erie & Western and Cleveland, Cincinnati, Chicago & St. Louis roads passing into adverse hands. The business interchanged between these two companies and the Vanderbilt system amounts to from six to eight million dollars a year, and the loss of it would therefore beserious. It was concluded that the safest plan would be to buy a majority of the stock of each road, so that the interest would not be very heavy, even if the roads were not able to pay dividends on their own securities. The control of both roads was secured at such price that undoubtedly they will pay at least the interest on the investment, in addition to being profitable feeders to the Vanderbilt system and interchanging business, which, it is hoped, will grow very largely.

NEW YORK, NEW HAVEN & HARTFORD.—The Norwich & Worcester offers its shareholders until Jan. 31 the privilege of subscribing, to the amount of one share for 12 held, for 2,308 shares of new preferred stock of the N. & W., at $215 per share, which is the price fixed by the Commissioner of Corporations. Subscribers must pay for the stock by Feb. 15. This stock is issued for the Norwich & Worcester extension built last year to Groton, Conn. (Dec. 15, 1899, p. 872.)

OLD COLONY.—A bill has been reported by the Committee on Railroads in the Massachusetts Senate to grant the company permission to issue 34,000 shares of stock for improvements authorized by the Railroad Commissioners.

QUINCY, CARROLLTON & ST. LOUIS.—This property, according to report, has been taken over by the Chicago & Alton, which is successor to the Litchfield, Carrollton & Western, and extends from Columbiana, Ill., to Barnett, 51.6 miles. (Feb. 3, 1899, p. 95.)

ST. PAUL & DULUTH.—Clarence S. Day of New York, gives notice for the benefit of stockholders at a distance that the time for accepting the offer of the syndicate has been extended to Jan. 31. The syndicate offers to buy stock at $50 per share and to give to each holder the privilege of becoming a member of the syndicate, with a right to subscribe thereto to the extent of 60 per cent. of the par value of their holdings. (Jan. 5, p. 14.)

SEABOARD AIR LINE.—The plan of consolidation of the greater Seaboard Air Line system provides for the issue of $62,500,000 consolidated 4 per cent. mortgage bonds. Of this, $19,670,000 is to be issued immediately; $27,830,000 to be reserved against prior liens, and $15,000,000 for future extensions and improvements. Of the immediate issue, $4,169,000 is to be for bonds of the system acquired; $6,550,000 goes to the Florida Central & Peninsular syndicate for the $24,500,000 stock of that company; $1,325,000 is to be issued in exchange for Georgia & Alabama preferred at 50, and $960,600 for Georgia & Alabama common at 25; $1,300,000 to retire car trust certificates; $536,000 for Durham & Northern 6s; 1,000,000 for the South Carolina extension from Hamlet south; $1,600,000 for retiring shares of Seaboard stock and stock in other roads held by minority stockholders, and $2,088,000 for stock bought by the Seaboard Syndicate. According to President Williams, the entire bonded debt will average only about $18,000 per mile, and the actual earnings of all the roads for the last fiscal year were sufficient to pay interest in full and leave a surplus of between $400,000 and $500,000. (Jan. 19, p. 48.)

The Seaboard Investment Co. has made application for incorporation in South Carolina, with a capital stock of $30,000, to deal in property in the interest of the Seaboard Air Line.

SEIVERN & KNOXVILLE.—The Southern Ry. has made application to the South Carolina Legislature for permission to remove the tracks of the S. & K. between Perry and Batesburg. The line was acquired last year. (Southern, May 26, 1899, p. 380.)

SIOUX CITY & NORTHERN.—The receivers on Jan. 15 made their final report and were discharged by the Court. The property passed on Dec. 31 under the control of the Great Northern and is to be operated as a part of the Willmar & Sioux Falls. (Jan. 5, p. 14.)

SOUTH BROOKLYN.—This company, whose incorporation was noted last week in the Railroad Construction column, is to be successor to the South Brooklyn Railroad & Terminal, which was sold under foreclosure Dec. 19. (Dec. 29, 1899, p. 902.)

TOLEDO, ST. LOUIS & KANSAS CITY.—The date of foreclosure sale of this property has been postponed from Feb. 14 to April 2. (Jan. 12, p. 30.)

WILMINGTON & NORTHERN.—This property on Jan. 17 was leased to the Philadelphia & Reading for 999 years from Feb. 1. The P. & R. recently acquired full control. (Dec. 22, 1899, p. 888.)

ZANESVILLE & OHIO.—This property was sold at public auction Jan. 20, at Zanesville, O., to representatives of the bondholders, for $260,000. The Ohio & Little Kanawha, whose incorporation was noted last week in the Construction column, is to succeed to the property. The road went into the hands of a receiver July 9, 1892. It runs from Zanesville, O., to West Marietta, 72.4 miles.